EXHIBIT 15

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

XR COMMUNICATIONS, LLC, dba VIVATO TECHNOLOGIES,

Plaintiff,

vs.

AT&T SERVICES INC., ET AL.,

Defendants.

ERICSSON, INC. ET AL.,

Intervenors.

Case No. 2:23-cv-00202-JRG-RSP

(LEAD CASE)

JURY TRIAL DEMANDED

DECLARATION OF JAMES A. PROCTOR

I, James A. Proctor, Jr., declare as follows:

1. I have been asked to provide an opinion concerning certain language that appears in U.S. Patent Nos. 7,177,369 (the "'369 Patent") and 8,289,939 (the "'939 Patent"). I understand that Plaintiff has also asserted U.S. Patent Nos. 8,737,511 (the "'511 Patent") and 10,715,235 (the "'235 Patent") against Defendants, though I have not been asked to provide opinions regarding the '511 and '235 Patents, though I may be asked to rebut, if necessary, any statements or opinions by Plaintiff's expert with which I disagree. Collectively, I refer to the '369, '939, '235, and '511 Patents as the "Asserted Patents." I have reviewed the Asserted Patents, as well as their respective prosecution histories. I have also reviewed extrinsic evidence regarding the patents, including any extrinsic evidence that Plaintiff has alleged is relevant to the construction of certain claim terms. If called upon, I would be willing to testify as set forth in this declaration.

I. QUALIFICATIONS

2. I am qualified by education and experience to testify as an expert in the field of telecommunications. Attached as Exhibit 1 to this declaration is a copy of my curriculum vitae detailing my education and experience. Additionally, the following overview of my background pertains to my qualifications for providing expert testimony in this matter.

3. I have worked as an engineer and entrepreneur in the field of wireless communications for over 25 years, and I have been involved with various aspects of wireless communications for the duration of my career.

4. I am currently a named inventor or co-inventor on more than 315 issued U.S. patents, and more than 700 international patent publications in total. A number of these patents and patent applications are related to the subject matter of the '235 patent. As an initial example of my relevant qualifications, a selection of my issued patents pertaining to aspects of cellular

networks, antennas, and antenna arrays are listed in the following table. The listed patents are either prior art or are contemporaneous to the claimed priority date of the '235 and '939 Patents.

U.S. Pat. Num.	Title	Priority Date
5,687,196	Range and bearing tracking system with multipath rejection	9/30/94
6,362,790	Antenna array structure stacked over printed wiring board with beamforming components	9/18/98
6,100,843	Adaptive antenna for use in same frequency networks	9/21/98
6,404,386	Adaptive antenna for use in same frequency networks	9/21/98
6,400,317	Method and apparatus for antenna control in a communications network	9/21/98
6,792,290	Method and apparatus for performing directional re-scan of an adaptive antenna	9/21/98
6,473,036	Method and apparatus for adapting antenna array to reduce adaptation time while increasing array performance	9/21/98
6,239,756	Antenna array with housing	11/19/99
6,545,990	Method and apparatus for a spectrally compliant cellular communication system	12/20/99
7,002,902	Method and system for economical beam forming in a radio communication system	2/24/00
6,396,456	Stacked dipole antenna for use in wireless communications systems	1/31/01
7,999,559	Method and apparatus for adapting antenna array using received predetermined signal	2/2/2001
7,425,928	Method and apparatus for frequency selective beam forming	6/12/2001
7,253,783	Low cost multiple pattern antenna for use with multiple receiver systems	9/17/2002

5. The following images depict a wireless product developed by myself and my team at WiDeFi, Inc., which included 3 antennas (2 microstrip patch antennas and a printed dipole).

6. For these reasons, and because of my technical experience and training as outlined below, I am qualified to offer technical opinions regarding the Asserted Patents.

7. A substantial portion of my work has been focused on wireless communication systems and products. For example, my educational background includes a BSEE from the University of Florida (1991) and MSEE from the Georgia Institute of Technology (1992) focusing on digital signal processing.

8. From 1986 to 1991, while at the University of Florida, I interned with Harris Corporation in various roles including mechanical design, software development, and digital design. From 1991 to 1992, while at Georgia Institute of Technology, I worked at the Georgia Tech Research Institute (GTRI) as a graduate research assistant, performing software development on classified government programs.

9. From 1993 to 1995, while working for Harris Corporation, I designed various cellular communications systems for voice, data, and tracking/location. Many of the systems I designed utilized advanced communications technologies, such as those utilized in the then-developing and future telecommunication standards (such as IS-95, W-CDMA, and aspects of LTE).

10. From 1995 to 1998, I worked at Spectrian in advanced development and technical marketing. At Spectrian, I interfaced with Nortel's and Qualcomm's product management and

performed advanced technology development and systems analysis. In this role, I designed IS-95 CDMA and GSM base station power amplifiers and control electronics, and received several patents associated with advanced linearization techniques for the reduction of transmitted distortion.

11. From 1998 to 2002, I served as the Director of Strategic and Technical Marketing at Tantivy Communications, a venture capital-funded 3G cellular data and chip set company. At Tantivy, I helped to architect and standardize the I-CDMA Spread Spectrum Systems Air Interface Standard (T1P1.4). I also developed both subscriber units and base stations that complied with the standard. The base stations utilized various IP protocols and interfaced with the wire line network utilizing IP over Ethernet. Additionally, I participated in and provided technical contributions to 3GPP/3GPP2 standardization efforts related to the development of CDMA2000 and 1xEV-DO. This work resulted in my being named as a co-inventor on more than 150 pending or issued U.S. patents or applications.

12. From 2002 to 2007, as co-founder of WiDeFi, Inc., I served in various roles including President, CEO, CTO, and board member. As the CEO, my responsibilities included advanced development of platform technologies. I was co-inventor of wireless technology components, including a frequency translating TDD repeater, a same frequency repeater architecture for TDD/FDD-based systems, and physical layer multi-stream MIMO repeater technology. WiDeFi invented and provided wireless home networking products based on WiFi and cellular technologies. While at WiDeFi, I was a named inventor on over 25 issued U.S. patents or patent applications.

13. From 2007 to 2009, I consulted as a principal engineer for Qualcomm Inc. as part of the acquisition of WiDeFi's technology. While at Qualcomm, I worked with its corporate R&D

division and developed consumer 3G and 4G cellular coverage enhancement systems utilizing WiDeFi's baseband interference cancellation technologies. My responsibilities included working with international cellular operators on product requirements, detailed W-CDMA simulations, Long Term Evolution ("LTE") systems analysis, and participation in prototype product realization. I am currently a named inventor on roughly 45 issued U.S. patents or patent applications assigned to Qualcomm.

14. From 2010 to the present, I have served as managing director and co-founder of Proxicom Wireless, LLC, which has developed and continues to develop cloud-based, mobile social networking and mobile payments technology based upon the proximity and location of mobile devices. Proxicom currently holds twelve issued U.S. patents and multiple pending patent applications, of which I am a co-inventor. Significant aspects of Proxicom's technology involve a mobile device's use of short range wireless technologies (802.11, near field communications, Bluetooth) in combination with cellular data links (3G/WCDMA or 4G/LTE, for example) to facilitate frictionless interactions via a wireless networked central cloud server.

15. Since 2007, I also have been the principal of Proctor Consulting, LLC. In this role, I have been a consultant relating to wired, wireless, and cellular communication and technologies, start-up companies and intellectual property. I also have been involved with numerous patent infringement, patent validity, and patent analysis assignments for public and private companies in the wired, wireless, and cellular networking industries.

16. Additionally, I have worked and consulted for both cellular infrastructure and device focused companies (Spectrian, Qualcomm, Fastback Networks), and defense contractors (Harris Corporation), where I developed covert-tracking and location technologies involving CDMA and smart-antenna technologies.

17. In various of the above-detailed roles, I have been responsible for the development of business plans, product development plans, product development budgets, and product bill of materials estimations. I have been responsible for numerous product development teams, including schedule and costs of the development process at various stages of my career. For example, at Tantivy Communications, I ran a joint development of I-CDMA cellular base stations in Seoul, Korea that were used in a field trial in that country. Additionally, as founder and CEO of WiDeFi, Inc., I was responsible for similar such activities, as required to raise venture capital funding and reporting to the board of directors.

18. I am being compensated for my expert work at the rate of USD $550 per hour. My compensation does not depend on the outcome of this case. Nor is it dependent on any of the opinions that I have provided in this Report or would provide in this case.

II. LEGAL STANDARD

19. I am not a patent lawyer, but counsel have informed me about the legal principles that apply in construing patent claims. As a general matter, I understand that the words of a claim are generally construed to have the plain and ordinary meaning as those words would have been understood by a person of ordinary skill in the art (a "POSITA") at the time of the invention based upon that person reading the claim terms themselves, the terms in the context of the claim in which they appear, the entire patent specification, including the figures, and the context of the file history of the patent and related patents. I also understand that terms must be construed based upon a complete understanding of what the inventor actually invented and intended to be covered (as evidenced in the patent and file history) by the claim in which the terms appear.

20. I also understand that an inventor can use terms in a manner other than in their plain and ordinary meaning by clearly, deliberately, and precisely defining those terms in the patent specification or in the file history.

21. I also understand that the "intrinsic evidence," which includes the claims, the specification, and the file history, including post-grant proceedings before the United States Patent and Trademark Office ("PTO"), are the most important tools to determine the meaning of a claim term and that "extrinsic evidence," such as dictionaries, textbooks, and other publications, may also provide guidance about the meaning of a claim term.

22. I also understand that if a claim term, read in-light of the specification and the prosecution history, fails to inform a POSITA with reasonable certainty about the scope of the invention, then the claim term is indefinite.

23. I understand that claim elements may be expressed as a means for performing a recited function. I further understand that for such a means-plus- function element, the element is to be construed to cover the corresponding structure, material, or acts described in the patent specification for performing that function and equivalents thereof. Thus, I understand that in the case of a means-plus-function element, the scope of the claim element is limited to only structure that is both actually disclosed in the patent specification and clearly linked to the claimed function(s).

24. I understand that even if a claim element does not use the word "means," such a claim element should still be treated as a means-plus-function element if a POSITA would understand that the claim element recites a function and that the words of the claim do not recite sufficiently definite structure for performing the claimed function(s).

25. I understand that if a claim element is found to be a means-plus-function claim element, there is a two-part analysis that involves: (1) identifying the function(s) and (2) identifying the corresponding structure from the specification that performs the function.

26. I understand that for a means-plus-function element directed to implementation via known computing elements, the patent specification must disclose at least an algorithm for performing the claimed function(s) in order to disclose sufficiently definite structure. I understand that such an algorithm may be expressed as a mathematical formula, in prose, or as a flow chart, or in any other manner that describes with reasonable certainty the way that such algorithm specifically performs the claimed function(s).

27. However, I also understand that the knowledge of a POSITA cannot be used to create a disclosure of structure for a means-plus-function element when the patent specification does not otherwise provide a sufficiently definite disclosure of corresponding structure that is clearly linked to performing the claimed function(s).

28. I further understand that when there are multiple claimed functions, the corresponding structure must be clearly linked to and be sufficiently definite for performing all such claimed functions.

29. I understand that when a patent fails to disclose sufficiently definite structure for performing the claimed function(s) of a means-plus-function element, the claims (and their dependents) in which such means-plus-function element appears are invalid.

III. MATERIALS CONSIDERED

30. In forming my opinions, I have reviewed the specifications of the Asserted Patents and their prosecution histories, as well as Plaintiff's Infringement Contentions. I note that the '939 Patent was previously asserted in District Court litigation in the Central District of California against NETGEAR and Aruba Networks, and in the Western District of Texas against Cisco. I have reviewed the parties' claim construction submissions in both cases as well as the claim construction orders that issued in both cases.

IV. LEVEL OF ORDINARY SKILL IN THE ART

31. I understand that the content of a patent (including its claims) and prior art should be interpreted the way a POSITA would have interpreted the material at the alleged time of invention unless otherwise construed by the Court as a matter of law.

32. I understand that the Plaintiff has alleged a time of invention of April 27, 2001 for the '369 Patent.

33. I understand that the Plaintiff has alleged a time of invention of February 1, 2002 for the '235 Patent.

34. I understand that the Plaintiff has alleged a time of invention of November 4, 2002 for the '939 Patent.

35. I understand that the Plaintiff has alleged a time of invention of April 13, 2012 for the '511 Patent.

36. In my opinion, a POSITA in the field of art related to the '369 and '939 Patents would have been a person familiar with wireless communications networks and equipment and would have had a combination of work experience and/or education. I believe that such a POSITA would have had at least a Bachelor's degree in an academic area emphasizing electrical engineering or a similar discipline, and at least two years of experience in the field working with, teaching, or researching wireless communication networks. Superior education could compensate for a deficiency in work experience, and *vice versa*.

37. Additionally, I believe that such a POSITA would have had at least a working knowledge of the protocols and architecture of common wireless communications networks, as well as an understanding of the components and subsystems within available wireless communication equipment. Further, a POSITA would have had an awareness of the specifications

and regulations governing electromagnetic transmission patterns in frequency bands applicable to common wireless communication networks.

38. I am a POSITA under this definition, and I would have been a POSITA under this definition as of the April 27, 2001 alleged invention date of the '369 Patent and the November 4, 2002 alleged invention date of the '939 Patent.

V. OVERVIEW OF THE '369 PATENT

39. The '369 Patent is titled "Multipath communication methods and apparatuses." It relates to "to data communications, and more particularly to wireless communication systems, apparatuses and related methods that support wireless communication in a multipath signal propagation environment." '369 Patent at 1:14-17. The '369 Patent explains that subscribers will move in a wireless communication network and that "there will not always be a clear or otherwise unobstructed communication path between a transmitting network and the receiving device." '369 Patent at 1:34-46. The '369 Patent further explains that "[m]ultipath propagation is primarily the reflections and diffraction from objects in the coverage area of the transmitting and receiving antennas," and multipath propagation can cause interference. '369 Patent at 3:12-17.

40. The '369 Patent's solution is to "identify[] at least one multipath transmission delay within a reverse path data signal, determin[e] at least one forward path pre-equalization parameter based on the transmission delay, and modify[] a forward data path signal based on the forward path pre-equalization parameter." '369 Patent at 2:1-8.

VI. OPINIONS REGARDING THE '369 PATENT

41. I understand that Plaintiff has asserted claims 1-7, 9-10, 12-14, 15, 19, 21, 28, 32-33, 35-37, and 41 of the '369 Patent.

A. "substantially reciprocal to"

Claim Term	**Defendants'/ Intervenors' Construction**	**Plaintiff's Construction**
"substantially reciprocal to" Claim 12	Indefinite	No construction necessary

42. Claim 12 depends from claim 3, which depends from claim 2, which in turn depends from claim 1.

43. Claim 1 recites:

A method comprising:

identifying at least one multipath transmission delay within a reverse path data signal received from a receiving device;

determining at least one forward path pre-equalization parameter based on said at least one transmission delay; and

modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one forward path pre-equalization parameter, where said modifying includes selectively setting different transmission power levels for at least two Orthogonal Frequency Division Multiplexing (OFDM) tones in said forward path data signal.

44. Claim 2 recites:

The method as recited in claim 1, further comprising:

receiving said reverse path data signal over ***at least one reverse transmission path***.

45. Claim 3 recites:

The method as recited in claim 2, further comprising:

transmitting said modified forward path data signal over ***at least one forward transmission path***.

46. Claim 12 recites:

The method as recited in claim 3, wherein ***said at least one reverse transmission path is substantially reciprocal to said at least one forward transmission path***.

47. The term "reciprocal" is used in the following context in the '369 Patent:

> As is well known, many materials are electromagnetically isotropic, which is a property resulting from symmetry in their associated permittivity and permeability tensors. The Lorentz Reciprocity Theorem applies to such materials. Refraction and dielectric reflection from materials therefore often show reciprocity, or equivalence of forward and reverse channel characteristics. Diffraction and reflection are inherently reciprocal due to the minimal media affecting the electromagnetic wave. Thus, reciprocity can be used to determine channel characteristics that are used while pre-equalizing a transmitted path. The use of a reciprocal channel is very useful, for example, when Time Division Duplex (TDD) channels are implemented.

'369 Patent, 7:22-34.

48. The term "substantially reciprocal" is thus used in the context of describing how reciprocal (*i.e.*, how equivalent) the reverse transmission path (channel characteristics) are to the forward transmission path (channel characteristics).

49. In my opinion, the term "substantially reciprocal" is indefinite. The '369 Patent provides no guidance on how reciprocal the reverse transmission path channel characteristics must be to the forward transmission path channel characteristics to be "substantially reciprocal." The degree of reciprocity is highly relevant to the design of wireless communication systems, and needs to be measurable using a definitive and analytical definition. Simply referring to "substantially reciprocal" does not inform a POSITA what degree of reciprocity is enough to meet this claim.

50. The term "reciprocal" is also disclosed in a specific example associated with a specific "fixed wireless system" using 802.11a:

> If TDD is used, then the channel can be assumed to be reciprocal for durations **(coherence time)** of approximately 10 ms. **The 10 ms duration can be determined in a fixed wireless system** by passing vehicles, moving people, blowing trees, and/or other interruptions nearby or within the communication path/region.

'369 Patent, 10:67-11:5.

51. For a given system configuration and "coherence time," the above example is assumed to be reciprocal. If this were a mobile system rather than the fixed system from the above example, and the receiver were moving, the changes in the environment would increase and the

coherence time (meaning the time duration over which the channel characteristics would not vary) would decrease making the system less "substantially" reciprocal. Similarly as system's configuration changes (such as data rate increasing), the reciprocity of the channel is valid for a shorter period of time because the higher data rate would require more accurate estimates of the channel characteristics between the forward and reverse channels. Thus, because the nature of whether a channel is sufficiently reciprocal depends on the characteristics, environment, and configuration of the system in question, a POSITA would not be able determine where the boundary lies between when the forward and reverse paths are substantially reciprocal when they are less than substantially reciprocal.

B. "a plurality of first device receive antennas"

Claim Term	**Defendants'/ Intervenors' Construction**	**Plaintiff's Construction**
"a plurality of first device receive antennas" Claim 19	Indefinite	No construction necessary

52. Claim 19 depends from claim 16, which depends from claim 13, which depends from claim 1. I reproduce claim 1 in paragraph 43 above.

53. Claim 13 recites:

> The method as recited in claim 1, wherein identifying said at least one multipath transmission delay, determining said at least one forward path pre-equalization parameter, and modifying said forward path data signal are performed by a transmitting device.

54. Claim 15 recites:

> The method as recited in claim 13, further comprising:
>
> using at least one transmitting device receive antenna operatively coupled to said transmitting device to receive said reverse path data signal over at least one reverse transmission path from the receiving device.

55. Claim 19 recites:

> The method as recited in claim 15, wherein said transmitting device is operatively coupled to a plurality of first device receive antennas.

56. In my opinion, the term "a plurality of first device receive antennas," when read in light of the specification and file history, does not inform a POSITA, with reasonable certainty, of the scope of the invention. In other words, a POSITA would find this term to be indefinite. The term is indefinite because of a lack of clarity as to which device is the "first device" to which the "plurality of . . . receive antennas" belong. It is not clear whether the "plurality of . . . receive antennas" belong to the "transmitting device" (which is introduced in claim 13), the "receiving device," or a newly introduced device referred to as a "first device." A POSITA would find it impossible to determine which device is the claimed "first device."

57. Additionally, other claims do use the terms "transmitting device [] antennas" and "receiving device [] antennas." *See*, *e.g.*, cls. 23 ("receiving device transmit antennas"), 35-36 ("transmitting device transmit antennas"), 39 ("receiving device receive antennas"). Thus, it is not clear from the language of other claims what the claimed "first device" is.

58. Further, neither the specification nor the prosecution history provides any guidance to a POSITA that would help determine what device has the "plurality of . . . receive antennas." While the specification uses the terms "receive antennas," "receiver antennas," and "receiving antennas," none of these uses informs a POSITA about the "device" these antennas belong to. *See, e.g.,* '369 Patent at 3:15 ("receiving antennas"), 4:64-65 ("receiving antennas"), 5:7-8 ("receiving antennas"), 5:52 ("receiver antennas"), 6:43-45 ("separate receive antennas"), 7:42 ("multiple receive antennas").

59. The presence of multiple possible interpretations, where the "first device" may be the "transmitting device," the "receiving device," or a third unclaimed device, creates significant

uncertainty about the scope of this claim. A POSITA would not understand which device is claimed "first device," and so the limitation "a plurality of first device receive antennas" lacks any certainty as to its meaning or scope, let alone reasonable certainty. Thus, in my opinion, this term is indefinite.

VII. OVERVIEW OF THE '939 PATENT

60. The '939 Patent is titled "Signal Communication Coordination," and its disclosure relates to "coordination of signals being communicated across one or more media and in particular, by way of example but not limitation, to preventing the thrashing of signals (e.g., packets) by coordinating the release of downlink packets with the reception of uplink packets using a media access control (MAC)-type mechanism." '939 Patent at 1:27-33.

61. The '939 Patent discloses an "exemplary access station implementation" including "wireless input/output (I/O) unit that is configured to establish multiple access points; and signal transmission/reception coordination logic that is capable of ascertaining that an access point of the multiple access points is receiving a signal and that is adapted to restrain at least one other access point of the multiple access points from transmitting another signal responsive to the ascertaining that the access point is receiving the signal." '939 Patent at 2:13-21.

62. Figure 1 (below) shows "an exemplary wireless communications environment 100" with an access station 102 that communicates wirelessly with multiple remote clients 104(1), 104(2) . . . (104(N). '939 Patent at 3:25-46.

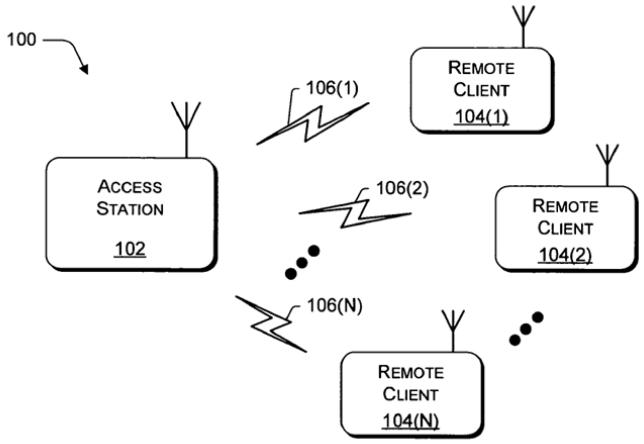

FIG. 1

63. The specification explains:

> In wireless communication, signals may be sent from a transmitter to a receiver using electromagnetic waves that emanate from one or more antennas as focused in one or more desired directions, which contrasts with omni-directional transmission. When the electromagnetic waves are focused in a desired direction, the pattern formed by the electromagnetic wave is termed a "beam" or "beam pattern." The production and/or application of such electromagnetic beams is typically referred to as "beamforming."

'939 Patent at 4:28-36.

64. The specification further describes this access station 102 in Figure 4 (below), which shows a wireless I/O unit 206 and signal transmission/reception coordination logic 404. Wireless I/O unit 206 is introduced in Figure 2, and in the Figure 4 embodiment establishes two or more access points 402. '939 Patent at 5:38-40.

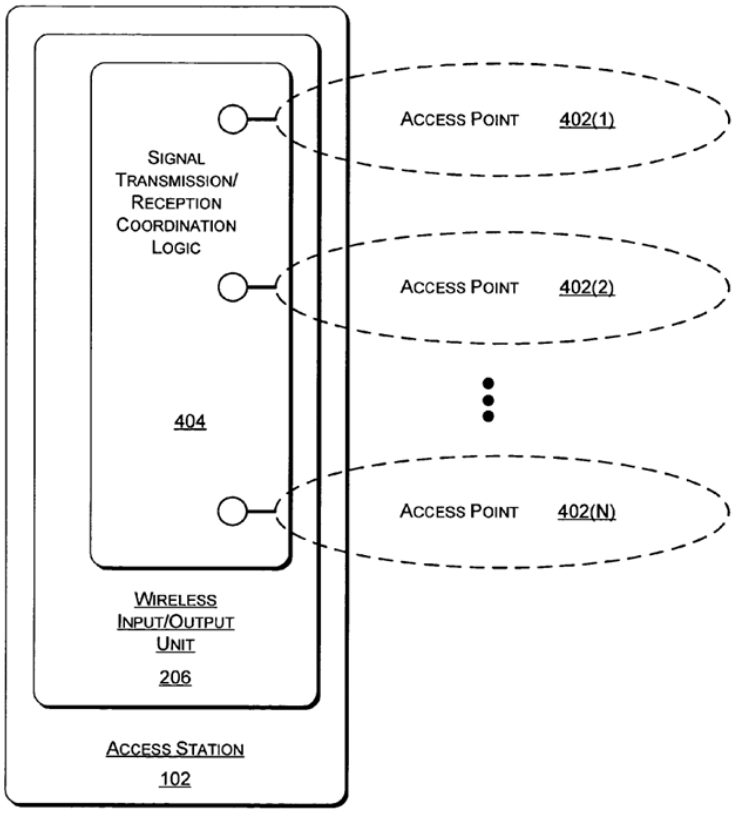

FIG. 4

65. The specification explains that a problem with access points utilizing beamforming is that "bleedover between access points 402 can occur," including, for example, downlink transmissions from one access point destroying uplink signal reception from another access point. '939 Patent at 5:48-56.

66. The '939 Patent's solution to this problem is using "signal transmission/reception coordination logic 404," which monitors multiple access points to "ascertain when a signal is being received." '939 Patent at 5:65-67. The signal transmission/reception coordination logic 404 "coordinates uplink signal receptions and downlink signal transmissions across different access points 402 so as to avoid or at least reduce the frequency at which downlink signals are transmitted

at a first access point[] while uplink signals are being received at a second access point." '939 Patent at 5:59-64.

67. Upon ascertaining that an access point is receiving a signal, "is capable of restraining (e.g., limiting preventing, delaying, etc.) the transmission of signals on other access points." '939 Patent at 6:1-15.

A. Prosecution History for the '939 Patent

68. U.S. Patent Application No. 10/700,342 (the "'342 Application") was filed on November 3, 2003, and lists Bobby Jose, Eduardo Casas, James Brennan, and Praveeen Mehrotra as inventors.

69. The '342 Application claims priority to two provisional applications, Provisional Application Nos. 60/423,702 and 60/423,696. Both provisional applications were filed November 4, 2002.

70. The original '342 Application contained 115 claims. Independent claim 107, which issued as claim 15, is reproduced below:

> **107.** An access station for wireless communications in a wireless system, the access station comprising:
>
> a wireless input/output (I/O) unit that is configured to establish a plurality of access points; and
>
> signal transmission/reception coordination logic that is capable of ascertaining that a first access point of the plurality of access points is receiving a first signal on a first channel and that is adapted to restrain a second access point of the plurality of access points from transmitting a second signal on a second channel based on the ascertaining that the first access point is receiving the first signal with an ongoing transmission on a third channel to prevent distortion to other signals being wirelessly communicated in the wireless system.

71. The Applicant cancelled originally filed claims 108, 27-36, and 45-102. '939 File History, Oct. 30, 2009 Claims. I understand that the Examiner rejected the remaining claims as obvious over U.S. Patent Publication No. 2003/0064752 ("Adachi '752") in view of U.S. Patent Pub. No. 2002/0031104 ("Griffith '104"), and U.S. Patent No. 6,983,167 ("Adachi '167"). '939 File History, Nov. 9, 2010 Non-Final Rejection.

72. In response, the Applicant argued that the claims required that "one access point is restrained in response to a different access point receiving a signal. In Adachi '752, specifically paragraph [0102], the access point which receives the signal is the same access point which is restrained." '939 File History, May 9, 2011 Office Action Response, at 13-14.

73. The Examiner rejected the claims over U.S. Patent Publication No. 2003/0214961 ("Nevo '961") in view of Griffith '104 and Adachi '167. '939 File History, November 8, 2011 Non-Final Rejection.

74. The Applicant responded by amending the claims and added new claim 116. In include the Applicant's marked up amendment to claim 107 below.

107. (Currently Amended) An apparatus ~~access station for wireless communications in a wireless system, the access station~~ comprising:

a wireless input/output (I/O) unit that is configured to establish a plurality of access points; and

signal transmission/reception coordination logic that is capable of ascertaining, by monitoring the plurality of access points for received signals, that:

a first access point of the plurality of access points is receiving a first signal on a first channel,

a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel, ~~and that restrains~~ the signal transmission/reception coordination logic adapted to restrain at least a ~~second~~ third access point of the plurality of access points from transmitting a ~~second~~ third signal on a ~~second~~ third channel ~~based on~~ responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ~~with an~~ ongoing ~~transmission~~ on a the second ~~third~~ channel,

wherein the restraining at least the third access point prevents degradation to the first and second signals ~~to prevent distortion to other signals being wirelessly communicated in the wireless system~~.

'939 File History, Jan. 30, 2012 Office Action Response at 5.

75. The Applicant's accompanying remarks distinguished Nevo '961 as "coordinating a frequency hopping transceiver (Bluetooth) and a potentially interfering 802.11 transceiver by determining the hopping pattern, selecting either the Bluetooth or the 802.11 transceiver as dominant, predicting the occurrence of interference, and preemptively notifying the dominated device to suspend transmission to avoid interference." '939 File History, January 30, 2012 Office Action Response at 8-10. The Applicant explained that the claims differed from Nevo because "the coordination logic of claim 9 ascertains, by monitoring the plurality of access points, that one access point is receiving a signal and in response restrains a second access point from transmitting an interfering signal. Rather than a Nevo's selecting a dominant transceiver, determining a hopping pattern, predicting when interference will occur, and preemptively preventing interference by notifying the dominated transceiver to stop transmission, claim 9 is directed to ascertaining by

monitoring a plurality of access points that any first access point is receiving and restraining at least a second access point from transmitting." '939 File History, January 30, 2012 Office Action Response at 8-10. The Applicant further argued that claim 107 (which issued as claim 15) was allowable for the same reasons as claim 9.

76. The Examiner then rejected some of the claims as obvious over Nevo '961 in view of Adachi '167 and U.S. Patent No. 7,779,071 ("Lor '071"), but allowed claims 107, 108, and 116, which issued as claims 15, 16, and 17.

77. The Applicant then amended the claims, and also added claim 117, which issued as claim 30. I reproduce claim 117 below:

> 117. (New) An apparatus comprising:
>
> a wireless input/output (I/O) unit that is configured to establish a plurality of access points; and
>
> signal transmission/reception coordination logic that is capable of ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel and that is adapted to restrain at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal.

78. The Examiner subsequently entered an amendment as a condition of allowance, but pending claims 107 and 117 were not affected by the Examiner's amendment.

VIII. OPINIONS REGARDING THE '939 PATENT

79. I understand that Plaintiff has asserted claims 15, 17, 20-22, 30, and 33-35 of the '939 Patent.

A. "wireless input/output (I/O) unit"

Claim Term	Defendants'/ Intervenors' Construction	Plaintiff's Construction

"wireless input/output (I/O) unit" Claims 15, 30	Governed by 35 U.S.C. § 112, ¶6, and indefinite Function: "establish a plurality of access points" Structure: None disclosed	Plain and Ordinary Meaning Alternative proposed construction, should the term be treated as a means-plus-function limitation: Function: "establish a plurality of access points" Structure: Wireless input/output unit 206 and equivalents thereof

80. Claims 15 and 30 recite a "wireless input/output (I/O) unit" that performs the following function:

- "establish a plurality of access points"

81. I understand that Plaintiff contends that the claim limitation "wireless input/output (I/O) unit" does not need to be construed and is not a means-plus-function limitation. I disagree. The term "wireless input/output (I/O) unit that is configured to establish a plurality of access points" does not have a customary, or plain and ordinary, meaning to a POSITA and Plaintiff cites to no extrinsic evidence or support for any plain and ordinary construction.

82. I understand that Defendants and Intervenors contend that this term should be construed under 35 U.S.C. § 112, ¶ 6, which I further understand to govern means-plus-function terms (which I describe my understanding of in § II).

83. Having considered the parties' positions, and based on my review of the claim language in the context of the specification and the prosecution history, it is my opinion that this

limitation is functional in nature and that the specification discloses no corresponding structure for performing the claimed function.

1. The term "wireless input/output (I/O) unit" is a means-plus-function term

84. I reproduce Claim 30 of the '939 Patent, which contains the "wireless input/output (I/O) unit" term, below:

> 30. An apparatus comprising:
>
> ***a wireless input/output (I/O) unit that is configured to establish a plurality of access points***; and
>
> signal transmission/reception coordination logic that is capable of ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel and that is adapted to restrain at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal.

85. The claimed "wireless input/output (I/O) unit" performs at least one claimed function, namely, "establish a plurality of access points." Further a POSITA would not understand that the term "wireless input/output (I/O) unit" or the words of claims 15 and 30 describe or recite sufficiently definite structure for performing the claimed function recited for this claim limitation.

86. I understand that Plaintiff has not identified any extrinsic evidence in its P.R. 4-2 disclosures that define the term "wireless input/output (I/O) unit" at the time of the alleged invention, either alone or with the claimed function "establish a plurality of access points."

87. By my own experience, the term "wireless input/output (I/O) unit" is not a standard term used by others in the art, and I have not encountered the term outside the context of Plaintiff's patents. Further, the term "wireless input/output (I/O) unit" is not a term of art associated with performing the function "establish a plurality of access points."

88. In my opinion, the term "unit" is a generic placeholder for anything that operates as a means for performing the claimed function. In the context of the claim, the term "unit" does not provide any indication of structure for providing the claimed "establish[ing]" function and sets forth a black box recitation of structure analogous to if the term "means" had been used. The term "wireless input/output (I/O)" does not impart any structure into the term "unit." I have reviewed the specification and file history and nothing in the specification or file history convey additional structure for performing the claimed function "establish a plurality of access points." At best, the words "wireless input/output (I/O)" only convey transmitting and receiving wireless signals to a POSITA. However, the '939 patent specification recites that a "wireless input/output unit 206" performs two functions: (1) establishing multiple access points, and (2) transmitting and/or receiving wireless signals. '939 Patent at 2:14-16, 4:20-25, 5:38-40. Thus, the '939 Patent makes clear that transmitting and receiving wireless signals is a separate function from establishing multiple access points.

89. I note that the '939 Patent never explains what it means to "establish a plurality of access points" or "establish[] multiple access points." While the '939 Patent states that the wireless (I/O) unit 206 establishes multiple access points, it never explains what that claimed function means. In my opinion the terms "establish a plurality of access points" and "establish multiple access points" are not terms of art, and a POSITA would not understand them without reading the patent specification. I performed a Google advanced search of these two terms individually, with a date range of Jan. 1, 1990 to November 4, 2002, and also with no date constraints. I did not find use of these terms in any literature which confirmed my understanding that these terms were not commonly used in that time period, or presently. Instead, the '939 Patent merely states that wireless

I/O unit 206 "establishes" multiple access points. *See, e.g.,* '939 Patent at Abstract, 2:14-16, 5:38-40, and 5:57-58.

90. In my opinion, a POSITA at the time of the alleged invention would not know what it meant to "establish" either "multiple access points" or "a plurality of access points."

91. For example a POSITA would understand that an access point is an individual device. The specification confirms this understanding, stating: " Each access point of the multiple access points **402** may correspond to, for example, an individual access point in accordance with an IEEE 802.11-based standard." 5:40-43. A POSITA would not understand what it means to establish an physical access point. I note that, in prior litigation, Plaintiff also took the position that this limitation is not a means-plus-function limitation and identified intrinsic evidence to support its position. I have reviewed this evidence that Plaintiff relies on, and I disagree with Plaintiff.

92. For example, in the Central District of California, Plaintiff identified "3:25-7:36" of the '939 Patent specification as intrinsic evidence to support its construction of "wireless input/output (I/O) unit." I have reviewed this passage of the specification and it does not support the position that "wireless input/output (I/O) unit" is not a means-plus-function limitation. Instead, it reinforces my opinion that the term is a means-plus-function limitation. The specification states, in the context of Figure 2: "FIG. 2 is an exemplary wireless LAN/WAN communications environment 200 that includes an access station 102, a wireless input/output (I/O) unit 206, an antenna array 208, and multiple communication beams 202." '939 Patent at 4:4-7. Further, the specification explains:

> Access station 102 includes wireless I/O unit 206. Wireless I/O unit 206 includes an antenna array 208 that is implemented as two or more antennas, and optionally as a phased array of antennas. Wireless I/O unit 206 is capable of transmitting

> and/or receiving (i.e., transceiving) signals (e.g., wireless communication(s) 106 (of FIG. 1)) via antenna array 208

4:17-23.

93. The specification's description of wireless I/O unit 206 in the context of Figure 2 only shows structure to transmit and receive signals, and does not show any structure for establishing multiple access points.

94. In the context of Figure 4, the specification explains:

> FIG. 4 illustrates an exemplary access station 102 that establishes multiple access points 402 and includes signal transmission/reception coordination logic 404. As illustrated, access station 102 includes a wireless I/O unit 206. Wireless I/O unit 206 includes or is associated with signal transmission/reception coordination logic 404. Such logic may be implemented as hardware, software, firmware, some combination thereof, and so forth.

5:30-37.

95. The only structure that the Figure 4 embodiment contains is "signal transmission/reception coordination logic," which the specification states "may be implemented as hardware, software, firmware, some combination thereof." Further, the specification never describes the signal transmission/reception coordination logic as establishing multiple access points.

96. Thus, in my opinion a POSITA would not understand that the term "wireless input/output (I/O) unit" discloses sufficient structure for performing the claimed function "establish a plurality of access points" and would understand that the term is a "means-plus-function" limitation.

2. The claimed function of the "wireless input/output (I/O) unit"

97. A POSITA would understand that the term "wireless input/output (I/O) unit," as recited in claims 15 and 30 would have the function "establish a plurality of access points."

3. The specification discloses no corresponding structure for performing the claimed function

98. As I discuss above, claims 15 and 30 of the '939 Patent do not recite sufficiently definite structure for performing the claimed function, and so a POSITA would look to the specification for corresponding structure that performs the claimed function for the recited "wireless input/output (I/O) unit." In my opinion, the specification of the '939 Patent does not disclose any structure for performing the claimed function "establish a plurality of access points."

99. In the event that this limitation is found to be a means-plus-function limitation, I understand that Plaintiff has identified "wireless input/output unit 206 and equivalents thereof" as corresponding structure.

100. As I explain above, the '939 Patent never explains what it means to "establish" one or more access points, which as I discuss above is a device. Instead, the '939 Patent simply states that multiple access points are established and states that there is "a wireless input/output (I/O) unit that is configured to establish multiple access points." '939 Patent at 2:13-16.

101. The Figure 4 embodiment, shown below, shows a number of access points 402, and the '939 Patent states "Fig. 4 illustrates an exemplary access station 102 that establishes multiple access points 402." '939 Patent at 5:30-31. Further, the '939 Patent explains that "In a described implementation, wireless I/O unit 206 establishes two or more access points 402, such as multiple access points 402(1), 402(2) . . . 402(N)." '939 Patent at 5:38-40.

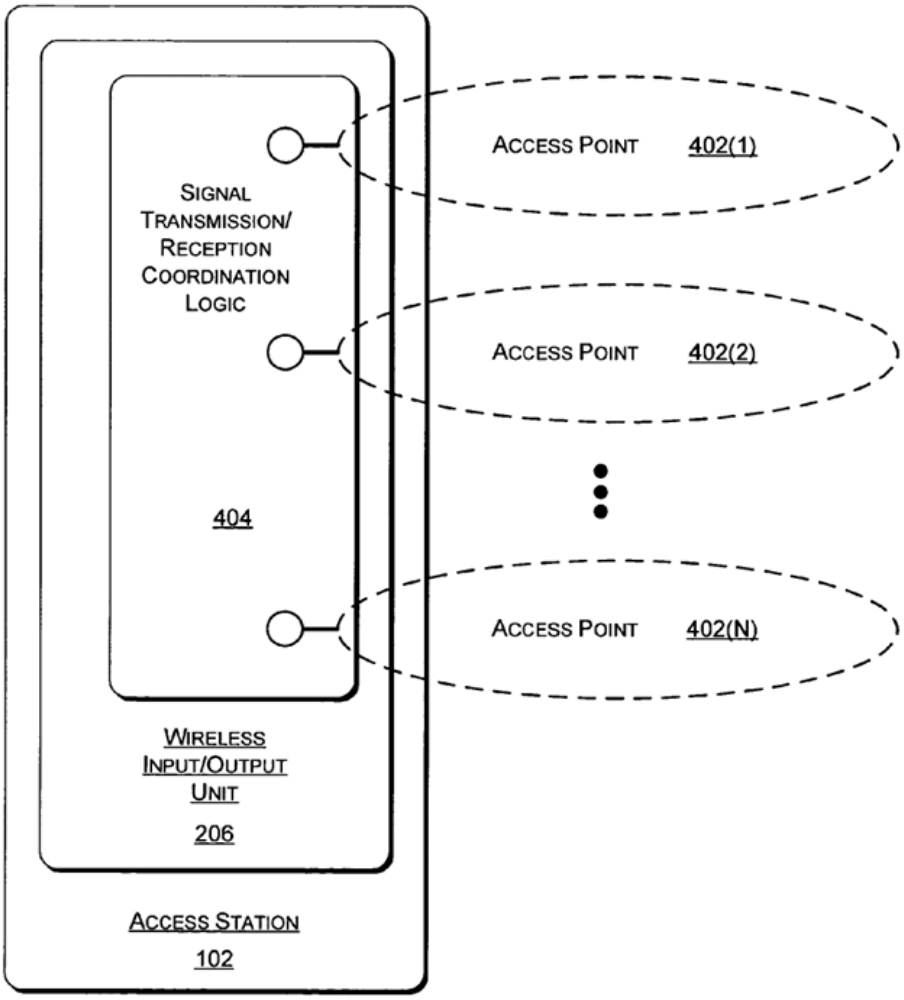

FIG. 4

102. However, the '939 Patent never explains what it means to "establish" multiple access points: the specification simply restates the claimed function.

103. Additionally, I note that the '939 Patent refers to "wireless input/output (I/O) unit 206" in the Figure 2, 4, and 6 embodiments. However, these embodiments do not recite sufficiently definite structure for a "wireless input/output (I/O) unit 206" that performs the claimed function.

104. First, the Figure 2 embodiment does not disclose any corresponding structure for performing the claimed function. Indeed, the Figure 2 embodiment (which is shown below) makes no mention of establishing multiple access points at all. Instead, the specification states that "FIG. 2 is an exemplary wireless LAN/WAN communications environment that includes an access station, a wireless input/output (I/O) unit, an antenna array, and multiple communication beams." '939 Patent at 2:53-56. Figure 2 shows an access station 102 including a wireless input/output unit 206. '939 Patent at 4:4-6, 4:17-27. The specification explains that wireless I/O unit 206 "includes an antenna array 208" and "is capable of transmitting and/or receiving (*i.e.*, transceiving) signals (*e.g.*, wireless communication(s) 106 (of Fig. 1)) via antenna array 208." 4:17-23.

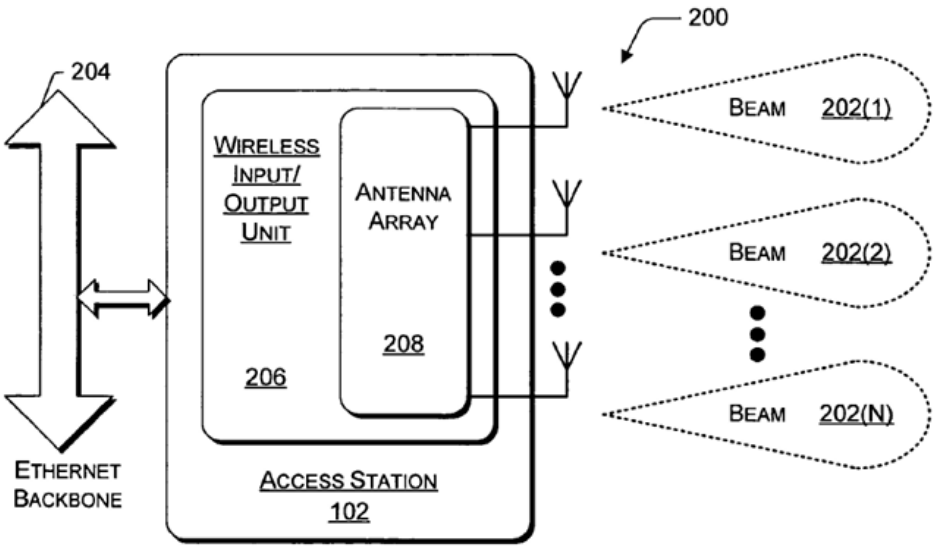

FIG. 2

105. The Figure 2 embodiment thus never discloses the claimed function: "establish a plurality of access points." The Figure 2 embodiment only ever discloses transmitting multiple communication beams, but communication beams are not the claimed access points.

106. Further, Figure 2 only discloses that wireless input/output unit 206 has an antenna array 208, which may be a phased array, and does not describe wireless input/output unit 206 as

having any other structure apart from implementing a beamformer. However, antenna array 208 (with or without a beamformer) is not structure that is capable of performing the function "establish a plurality of access points" and the '939 Patent specification never links antenna array 208 to the claimed function. I note that the disclosed antenna array, including those with beamformers, only addresses the wireless coverage areas of an access point, but cannot establish an access point itself (which is a device). This understanding is consistent with the example of "an individual access point in accordance with an IEEE 802.11-based standard" being a device and not a coverage area. The '939 Patent confirms this distinction between an access point and a coverage area, stating that "Additionally, a wireless coverage area or region for each respective access point 402 of the multiple access points 402 may correspond to, for example, a respective communication beam 202 of multiple communication beams 202." 5:43-47.

107. The Figure 4 embodiment also does not disclose any corresponding structure that performs the recited function. The specification states that "FIG. 4 illustrates an exemplary access station that establishes multiple access points and includes signal transmission/reception coordination logic." '939 Patent at 2:59-61. Figure 4 explains that access station 102 includes a wireless I/O unit 206, and this wireless I/O unit 206 "includes or is associated with signal transmission/reception coordination logic 404." '939 Patent at 5:30-35. The '939 Patent explains "such logic may be implemented as hardware, software, firmware, some combination thereof, and so forth." '939 Patent at 5:35-37.

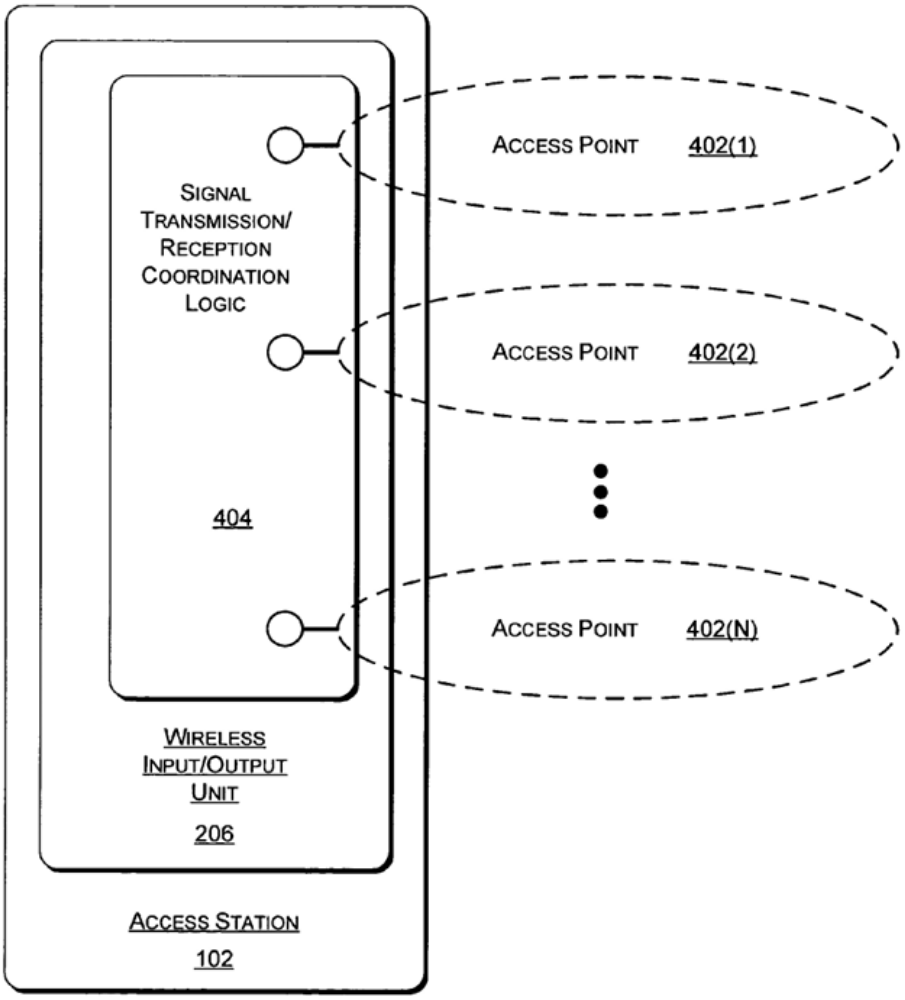

FIG. 4

108. While Figure 4 explains that "wireless I/O unit 206 establishes two or more access points 402," it never explains how an access point is established. '939 Patent at 5:38-40. Indeed, as I explain above, Figure 4 does not disclose any structure at all: the only disclosed components are wireless input/output unit 206 and signal transmission/reception coordination logic 404. The '939 Patent makes clear that this logic does not have any definite structure, instead stating that "such logic may be implemented as hardware, software, firmware, some combination thereof, and so forth." '939 Patent at 5:35-37. And the '939 Patent does not disclose any algorithm or procedure

that this "hardware, software, firmware, [or] some combination thereof" would use to "establish a plurality of access points."

109. Similarly, the Figure 6 embodiment also does not disclose any corresponding structure that performs the claimed function. The specification explains that "FIG. 6 illustrates an exemplary access station that includes multiple components such as medium access controllers (MACs), baseband (BB) units, and MAC coordinator logic." '939 Patent at 2:65-67. Figure 6 (below) "illustrates an exemplary access station 102 that includes multiple components such as medium access controllers (MACs) 604, baseband (BB) units 608, and MAC coordinator logic 606." '939 Patent at 6:54-57. "[A]ccess station 102 also includes an Ethernet switch and/or router 602, radio frequency (RF) parts 610, a beamformer 612, and antenna array 208." '939 Patent at 6:57-60. I note that this description of Figure 6 makes no mention of establish[ing] a plurality of access points.

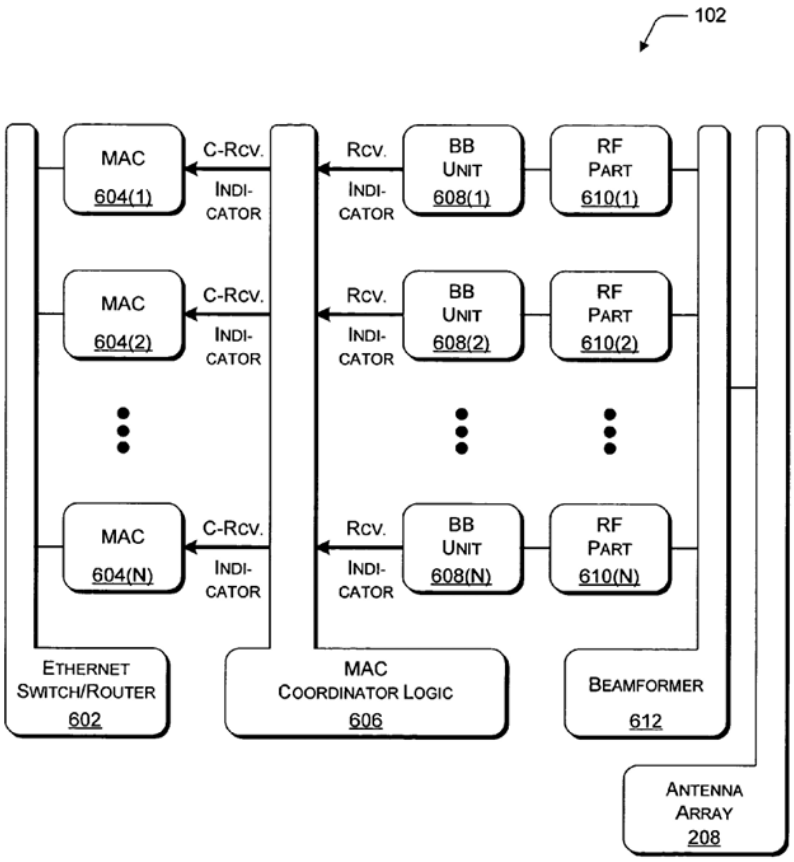

FIG. 6

110. The '939 Patent does suggest that wireless input/output unit 206 may "correspond to MACs 604, MAC coordinator logic 606, BB units 608, and RF parts 610" and may further include "one or more of Ethernet switch/router 602, beamformer 612, and antenna array 208." 6:60-64. However, the Figure 6 embodiment does not disclose the function "establish a plurality of access points," and does not link any structure to performing that function.

111. Indeed, the structure recited in the Figure 6 embodiment, including "baseband (BB) units 608," "Ethernet switch and/or router 602, radio frequency (RF) parts 610, a beamformer 612, and antenna array 208" is not structure that that a POSITA would associate with the function "establish a plurality of access points."

112. Indeed, the specification confirms this lack of disclosure, explaining that the embodiments in the patent, *i.e.*, "[t]he diagrams of FIGS.1-13" "are illustrated as blocks representing features, devices, logic, functions, actions, some combination thereof and so forth." '939 Patent at 18:56-58. The specification makes this even more clear and states

> "By way of example only, the blocks of FIGS. 1-13 (e.g., the components of FIGS. 2, 4, 6, 8, and 10-13 and/or the actions of FIGS. 5, 7, and 9) may be implemented fully or partially as one or more processors and/or as one or more media. Such processors may be general purpose microprocessors, special-purpose digital signal processors, some combination thereof, and so forth. Such media may be transmission or storage media, volatile or non-volatile memory, programmable or hard-wired coding, some combination thereof, and so forth."

'939 Patent at 18:66-19:7.

113. Thus, it is my opinion that the '939 Patent does not disclose any structure for performing the claimed function "establish a plurality of access points" and does not link any structure to performing this function.

B. "signal transmission/reception coordination logic"

Claim Term	**Defendants'/ Intervenors' Construction**	**Plaintiff's Construction**
"signal transmission/reception coordination logic" Claims 15, 30	Governed by 35 U.S.C. § 112, ¶6, and indefinite Function: Claim 15: "ascertaining, by monitoring the plurality of access points for received signals, that:" (i) "a first access point of the plurality of access points is receiving a first signal on a first channel," (ii) "a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel," (iii) "restrain[ing] at least a third access point of the	Plain and Ordinary Meaning; no construction necessary Alternative proposed construction, should the term be treated as a means-plus-function limitation: Function: Claim 15: ascertaining, by monitoring the plurality of access points for received signals, that: a first access point of the plurality of access points is receiving a first signal on a first channel,

	plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel, wherein the restraining at least the third access point prevents degradation to the first and second signals" Structure: None disclosed Claim 30: (i) "ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel" and (ii) "restrain[ing] at least a second access point of the plurality of access points from transmitting a second signal on asecond channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal." Structure: None disclosed	a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel, restrain[ing] at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel, wherein the restraining at least the third access point prevents degradation to the first and second signals. Claim 30: ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel, restrain[ing] at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal. Structure: Signal transmission/reception logic 404 and/or MAC coordinator logic 606 and/or 6:1-51 and/or 6:65-7:20 and/or 9:11-59 and/or 11:19-12:21 and/or 14:28-15:22 and/or 15:23-65 and/or 16:53-

		67 and/or 18:12-55 and equivalents thereof. The corresponding structure of "signal transmission/reception logic 404" includes the characteristics and configuration set forth for the signal transmission/reception coordination logic 404 (and the MAC coordinator logic 606, which is subsumed within the corresponding structure of the signal transmission/reception coordination logic 404) in the '939 Patent, including at 6:1-51 and/or 6:65-7:20 and/or 9:11-59 and/or 11:19-12:21 and/or 14:28-15:22 and/or 15:23-65 and/or 16:53-67 and/or 18:12-55, and equivalents thereof.

114. Claim 15 and 30 recite "signal transmission/reception coordination logic" which performs the following functions:

- "ascertaining, by monitoring the plurality of access points for received signals, that:" (i) "a first access point of the plurality of access points is receiving a first signal on a first channel," (ii) "a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel," (iii) "restrain[ing] at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel, wherein the restraining at least the third access point prevents degradation to the first and second signals" (claim 15)

- "ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel" (claim 30)

- "restrain[ing] at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal." (claim 30)

115. I understand that Plaintiff contends that the claim limitation "signal transmission/reception coordination logic" does not need to be construed and is not a means-plus-function limitation. I disagree. The term "signal transmission/reception coordination logic" does not have a customary, or plain and ordinary, meaning to a POSITA and Plaintiff cites to no extrinsic evidence or support for any plain and ordinary construction.

116. I understand that Plaintiff also contends that, if this term is found to be a means-plus-function limitation, this limitation has the function and corresponding structure that I reproduce in the table above.

117. I understand that Defendants and Intervenors contend that this term should be construed under 35 U.S.C. § 112, ¶ 6, which I further understand to govern means-plus-function terms (which I describe my understanding of in § II).

118. Having considered the parties' positions, and based on my review of the claim language in the context of the specification and the prosecution history, it is my opinion that this limitation is functional in nature and that the specification discloses no corresponding structure for performing the claimed functions.

1. The term "signal transmission/reception coordination logic" is a means-plus-function term

119. I reproduce Claim 15 of the '939 Patent, which contains the "signal transmission/reception coordination logic" term, below:

An apparatus comprising:

a wireless input/output (I/O) unit that is configured to establish a plurality of access points; and

signal transmission/reception coordination logic that is capable of ascertaining, by monitoring the plurality of access points for received signals, that:

a first access point of the plurality of access points is receiving a first signal on a first channel,

a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel, the signal transmission/reception coordination logic adapted to restrain at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel,

wherein the restraining at least the third access point prevents degradation to the first and second signals.

120. I reproduce Claim 30 of the '939 Patent, which contains the "signal transmission/reception coordination logic" term with a different function, below:

30. An apparatus comprising:

a wireless input/output (I/O) unit that is configured to establish a plurality of access points; and

signal transmission/reception coordination logic that is capable of ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel and that is adapted to restrain at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal.

121. The claimed "signal transmission/reception coordination logic" performs several functions, which I identify above in paragraph 114. However, the term "signal transmission/reception coordination logic" does not recite sufficiently definite structure for performing the claimed functions. The term "signal transmission/reception coordination logic" is not a standard term used by others in the art. I know of no dictionary or textbook that defines or even mentions the term "signal transmission/reception coordination logic." In fact, I have never encountered the term other than in the '939 Patent.

122. Further, I note that the word "logic," in the context of this limitation and in view of the '939 Patent specification, is a "nonce" word. The term "logic" does not convey any structural information to a POSITA, much like other "nonce" terms like "module," "unit," "component," or "device." The specification of the '939 Patent confirms the "nonce" nature of the term "logic," because when describing "signal transmission/reception coordination logic 404," the specification states that "Such logic may be implemented as hardware, software, firmware, some combination thereof, and so forth." '939 Patent at 5:30-37.

123. Indeed, the '939 Patent explains that almost its entire disclosure is functional in nature, stating: "The diagrams of FIGS. 1-13 are illustrated as blocks representing features, devices, logic, functions, actions, some combination thereof, and so forth. However, the order and/or layout in which the diagrams are described and/or shown is not intended to be construed as a limitation, and any number of the blocks can be combined, augmented, omitted, and/or re-arranged in any order to implement one or more methods, systems, apparatuses, access stations, arrangements, schemes, approaches, etc. for signal communication coordination." '939 Patent at 18:56-65.

124. The '939 Patent further explains that the preferred embodiments "the features, logic, devices, and functions" of the preferred embodiments in Figures 2-4, 6, 8, and 10-13 "can be implemented in any suitable hardware, software, firmware, or combination thereof and using any suitable coding/logical mechanism(s), wireless protocol paradigm(s), radio frequency technology, and so forth." '939 Patent at 19:11-19.

125. I understand that Plaintiff appears to take the position that "signal transmission/reception coordination logic" can be MAC coordinator logic, such as MAC coordinator logic 606. However, the specification states that MAC coordinator logic can be

anything, stating that "MAC coordinator logic 606 may be implemented as hardware, software, firm ware, some combination thereof, and so forth." '939 Patent at 7:18-20. In other words, much like signal transmission/reception coordination logic 404, MAC coordinator logic 606 does not convey any structural information to a POSITA.

126. Additionally, the specification states that "signal transmission/reception coordination logic" can be implemented in either the baseband level or at a "MAC level." '939 Patent at 18:12-44. A POSITA would understand that "logic" operating at the baseband level would be very different from "logic" operating at the MAC level.

2. The claimed functions of the "signal transmission/reception coordination logic"

127. A POSITA would understand that the claimed "signal transmission/reception coordination logic" to have the following functions:

- Claim 15: "ascertaining, by monitoring the plurality of access points for received signals, that:" (i) "a first access point of the plurality of access points is receiving a first signal on a first channel," (ii) "a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel," (iii) "restrain[ing] at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel, wherein the restraining at least the third access point prevents degradation to the first and second signals"

- Claim 30: (i) "ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel" and (ii) "restrain[ing] at least a second access point of the plurality of access points from transmitting a second signal on asecond channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal."

3. The specification discloses no corresponding structure for performing the claimed functions

128. As I discuss above, the claims of the '939 Patent do not recite sufficiently definite structure for "signal transmission/reception coordination logic" that performs the recited functions.

A POSITA would look to the specification for corresponding structure that performs the claimed function. In my opinion, the specification discloses no structure that performs the claimed functions that I identify above in paragraph 127.

129. The '939 Patent describes "signal transmission/reception coordination logic that is capable of ascertaining that an access point of the multiple access points is receiving a signal and that is adapted to restrain at least one other access point of the multiple access points from transmitting another signal responsive to the ascertaining that the access point is receiving the signal." '939 Patent at 2:16-21.

130. However, the '939 Patent never explains how the "signal transmission/reception coordination logic" performs the function of "ascertaining" that an "access point" is receiving a signal on a first channel, which claims 15 and 30 both require.

131. Further claims 15 and 30 both include the requirement that the "signal transmission/reception coordination logic" "restrain" a different access point from transmitting on a different channel in response to the ascertaining that an access point is receiving on a first channel. For example, claim 30 requires the step:

- "signal transmission/reception coordination logic . . . that is adapted to restrain at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal [on a first channel]"

132. Similarly, claim 15 requires the step:

- "the signal transmission/reception coordination logic adapted to restrain at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal [on a first channel] and that the second access point is receiving the second signal that is ongoing-on the second channel"

133. I note that the Figure 4 embodiment (below) describes a "signal transmission/reception coordination logic 404." However, this is not corresponding structure for

performing the recited functions. I note that the specification (including in the discussion of the Figure 4 embodiment) only ever describes the "signal transmission/reception coordination logic" in functional terms, and expressly states that "such logic may be implemented as hardware, software, firmware, some combination thereof, and so forth." This broad description of logic, *i.e.* some combination of hardware, software, and firmware, does not inform a POSITA about the structure that performs the recited functions.

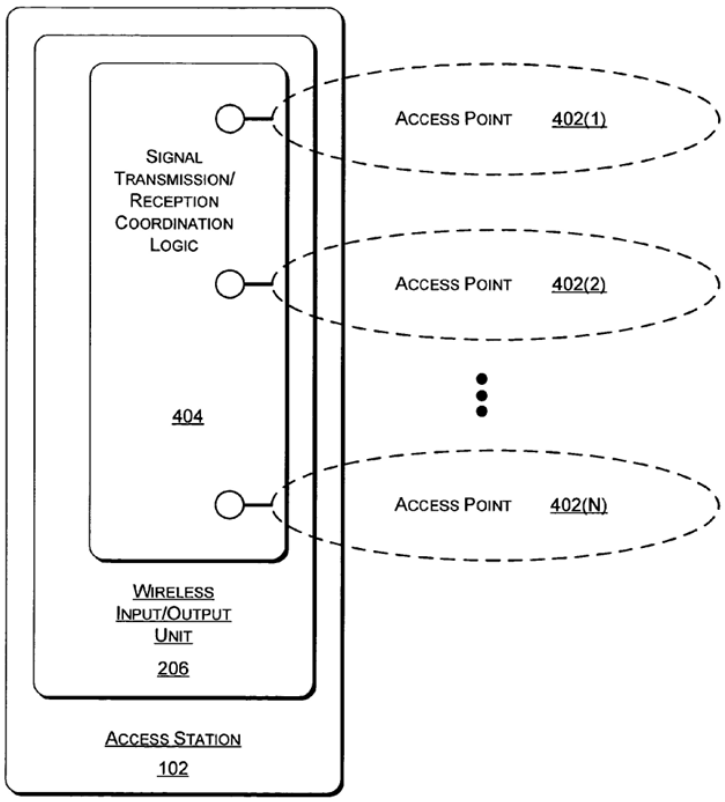

FIG. 4

134. Further, the discussion of the Figure 4 embodiment only repeats the stated functions without ever explaining how those functions are performed. The specification only states that "Specifically, signal transmission/reception coordination logic 404 is adapted to monitor the multiple access points 402(1 . . . N) to ascertain when a signal is being received. When an access

point 402(w) is ascertained to be receiving a signal, signal transmission/reception coordination logic 404 is capable of restraining (e.g., limiting, preventing, delaying, etc.) the transmission of signals on the other access points 402(1 . . . w−1, w+1 . . . N).” 5:65-6:5. This disclosure simply repeats parts of the function of the “signal transmission/reception coordination logic,” *i.e.* “ascertaining” whether an access point is receiving a signal and “restraining” a different access point from transmitting, but without any explanation of what structure performs the functions of “ascertaining” and “restraining.” Further, this disclosure only repeats *part of* the claimed functions.

135. For example, the disclosure accompanying the Figure 4 embodiment also states that “one access point 402 . . . may operate on a different channel from that of another access point 402 . . . If the different channels are adjacent and/or not sufficiently-well defined, it may be beneficial to restrain transmission on a first channel with a first access point 402 even when receiving a wireless communication on a second different channel with a second access point 402.” ’939 Patent at 6:39-46. Further, “for different channel situations, signal transmission/reception coordination logic 404 may restrain transmission on one channel on the basis of reception on another channel with an ongoing transmission on a third channel to prevent (e.g., inter-modulation) distortion to the signals being communicated in the wireless system.” ’939 Patent at 6:47-53. However, these disclosures merely restate functions, such as the functions I discuss above in paragraphs 131 and 132. The discussion of the Figure 4 embodiment includes no structure that performs the claimed function.

136. Further, while the ’939 Patent discloses a “flow diagram 500” in Figure 5 that “illustrates an exemplary method for using an access station having signal transmission/reception coordination logic for multiple access points,” 6:16-18, this flow diagram does not disclose any

structure for performing the recited functions. The discussion of Figure 5 only states that "at block 502, multiple access points are monitored," and that "at block 504, it is ascertained that an access point of the multiple monitored access points is receiving a signal," and "at block 506, the other access points of the multiple monitored access points are restrained from transmitting a signal." '939 Patent at 6:16-38. This disclosure in Figure 5 merely states that a function is performed, and it does not inform a POSITA as to what structure performs those functions. In addition, the discussion of Figure 5 does not disclose any of the restraining on a different channel functions that I discuss above in paragraphs 131 and 132.

137. Additionally, the Figure 10 embodiment (below), also "illustrates an exemplary implementation 1000 for signal transmission/reception coordination logic 404." '939 Patent at 15:23-25. However, the discussion of this embodiment also does not disclose corresponding structure for performing the claimed functions.

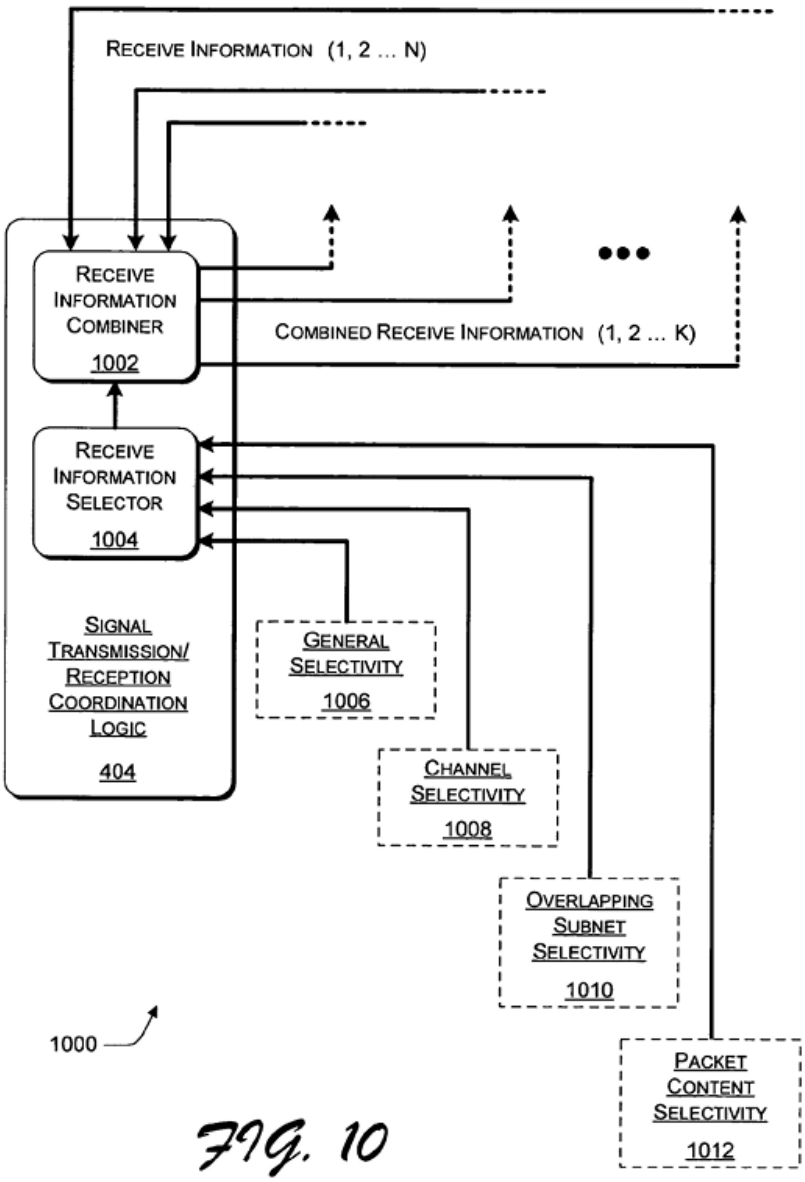

FIG. 10

138. In describing Figure 10, the specification only states that "signal transmission/reception coordination logic 404 accepts as inputs receive information (1, 2, . . . N) and produces as outputs combined receive information (1, 2, . . . K). The number of 'N' receive information inputs may not equal the number 'K' of combined receive information outputs." 15:25-30. The discussion of Figure 10 only discloses two functional components, as shown in Figure 10: receive information combiner 1002 and receive information selector 1004. 15:31-33.

However, as was the case in Figure 4, the Figure 10 embodiment only describes these components in functional terms.

139. For example, the specification states that "receive information combiner 1002 applies a signal coordination function to the receive information (1, 2 . . . N) to produce the combined receive information (1, 2 . . . K)" and that "receive information selector 1004 enables a selectivity to be applied to the combining of the receive information (1, 2 . . . N). Factors controlling this receive information selectivity are generally represented by general selectivity 1006. Receive information selector 1004 instructs receive information combiner 1002 as to what receive information (1, 2 . . . N) is to be combined or excluded and into which groups or segments." '939 Patent at 15:34-47. The specification never explains what structure "receive information combiner 1002" and "receive information selector 1004" have, and a POSITA would not know what structure performs these functions.

140. I note that the specification does state that "[i]n a more-specific implementation with reference to FIGS. 6 and 8, signal transmission/reception coordination logic 404 may be realized as MAC coordinator logic 606." 15:49-51. However, MAC coordinator logic 606 is also not sufficient structure for performing the claimed function.

141. MAC coordinator logic is first discussed in the context of Figure 6, where "FIG. 6 illustrates an exemplary access station 102 that includes multiple components such as medium access controllers (MACs) 604, baseband (BB) units 608, and MAC coordinator logic 606." 6:54-57. The specification makes clear that, like signal transmission/reception coordination logic 404, MAC coordinator logic 606 can be anything, stating "MAC coordinator logic 606 may be implemented as hardware, software, firmware, some combination thereof, and so forth." 7:18-20.

142. Further, MAC coordinator logic 606 is not described as performing the claimed function. For example, the discussion of Figure 6 simply states that "MAC coordinator logic 606 is configured to coordinate the activities of the multiple MACs 604 (e.g., as a multi-MAC controller (MMC)) with regard to at least one non-associated respective BB unit 608. For example, MAC coordinator logic 606 may forward an instruction to MAC 604(1) responsive, at least partly, to an indicator provided from BB unit 608(2)." 7:11-18. A POSITA would not understand this disclosure accompanying Figure 6 to describe performing any of the recited functions, including the functions I discuss above in paragraphs 131 and 132. More specifically, a POSITA would not understand this disclosure as describing, for example, ascertaining reception by a first access point on a first channel and restraining transmission by a second access point on a second channel.

143. The specification further describes the operation of MAC coordinator logic and states: "MAC coordinator logic 606 is coupled to both of multiple BB units 608(1, 2 . . . N) and multiple MACs 604(1, 2 . . . N). In a described implementation, MAC coordinator logic 606 is configured to prevent MACs 604(1, 2 . . . N) from causing a transmission if at least one and optionally if any of BB units 608(1, 2 . . . N) are receiving. For example, if BB unit 608(2) indicates that it is receiving a packet, MAC coordinator logic 606 instructs MACs 604(1, 2 . . . N) so as to restrain them from causing a packet transmission during the packet reception." 9:11-20. The specification further explains that: "MAC coordinator logic 606 is thus able to monitor BB units 608(1, 2 . . . N). MAC coordinator logic 606 analyzes the receive indicators to produce a constructive receive indicator ("C-Rcv. Indicator" in FIG. 6)." 9:28-31. However, a POSITA would not understand these disclosures accompanying Figure 6 to disclose performing any of the recited functions, such as ascertaining reception by a first access point on a first channel and restraining transmission by a second access point on a second channel. Additionally, a POSITA

would not understand these disclosures as describing any specific structure for MAC coordinator logic 606, which the specification explicitly states "may be implemented as hardware, software, firmware, some combination thereof, and so forth." 7:18-20.

144. The specification then discusses the operation of MAC coordinator logic 606 with respect to Figure 8, which "illustrates another exemplary access station 102A" which includes "thirteen MACs 604" and thirteen "BB units 608". 10:61-65. However, the Figure 8 embodiment does not impart any structure to the MAC coordinator logic 606. Instead, it simply states that "MAC coordinator logic 606 (and signal transmission/reception coordination logic 404 (of FIG. 4)) may be modified, tweaked, expanded, etc. based on any one or more of many factors." 11:54-57. These factors include "channel assignment information 802, receive indicator enable information 804, timer logic 816, and scanning logic 812." 11:58-60. These additional factors, however, do not impart any structure to MAC coordinator logic 606.

145. Further, the Figure 8 embodiment discloses the opposite of the claimed functions. Where the claims require ascertaining reception by a first access point on a first channel and restraining transmission by a second access point on a second channel, the Figure 8 embodiment discloses:

> Channel assignment information 802 enables receive indicators (1, 2 . . . 13) to be combined by receive indicators combiner 810 on a per-channel basis. As a result, constructive receive indicators (1, 2 . . . 13) restrain signal transmissions from MAC 604/BB unit 608 pairs when a signal reception is occurring on the same channel, even if by a different MAC 604/BB unit 608 pair. A downlinked packet that is transmitted on one channel while an uplinked packet is being received on another channel does not usually cause the uplinked packet to be thrashed (as long as the two channels are sufficiently well-defined or otherwise separated). On the other hand, a downlinked packet that is transmitted on a channel while an uplinked packet is being received on the same channel does usually cause the uplinked packet to be thrashed, even if the transmission and reception occur using different communication beams 202 (of FIGS. 2 and 3).

11:65-12:13.

146. Finally, I have reviewed the structure proposed by Plaintiff, which is:

> Signal transmission/reception logic 404 and/or MAC coordinator logic 606 and/or 6:1-51 and/or 6:65-7:20 and/or 9:11-59 and/or 11:19-12:21 and/or 14:28-15:22 and/or 15:23-65 and/or 16:53- 67 and/or 18:12-55 and equivalents thereof.
>
> The corresponding structure of "signal transmission/reception logic 404" includes the characteristics and configuration set forth for the signal transmission/reception coordination logic 404 (and the MAC coordinator logic 606, which is subsumed within the corresponding structure of the signal transmission/reception coordination logic 404) in the '939 Patent, including at 6:1-51 and/or 6:65-7:20 and/or 9:11-59 and/or 11:19-12:21 and/or 14:28-15:22 and/or 15:23-65 and/or 16:53-67 and/or 18:12-55, and equivalents thereof.

147. In my opinion, Plaintiff's proposed structure is not sufficient to perform the claimed functions, including the functions requiring restraining an access point on a different channel as I describe above in paragraphs 131 and 132.

148. I note that Plaintiff's proposed structure includes signal transmission/reception coordination logic 404, which is neither corresponding structure nor sufficient structure for the reasons I discuss above in paragraphs 133 to 139.

149. Plaintiff's proposed structure also states that the "corresponding structure of 'signal transmission/reception coordination logic 404' includes the characteristics and configuration set forth for the signal transmission/reception coordination logic 404." In addition to my opinion that signal transmission/reception coordination logic 404 is neither corresponding structure nor sufficient structure for the reasons I discuss above, I note that Plaintiff's position appears to be that its alleged corresponding structure performs the functions recited in the specification regardless of whether they appear in the claim language. Further, I note that "characteristics and configuration" is a description of the functions that signal transmission/reception coordination logic 404 performs, and does not describe the structure that performs those functions.

150. I also note that Plaintiff's proposed structure includes MAC coordinator logic 606, which is neither corresponding structure nor sufficient structure for the reasons I discuss above in

paragraphs 140 to 145. Further, I note that Plaintiff appears to take the position that MAC coordinator logic 606 "is subsumed within the corresponding structure of the signal transmission/reception coordination logic 404." In addition to my opinions above regarding the lack of structure for both signal transmission/reception coordination logic 404 and MAC coordinator logic 606, I cannot find any support in the '939 Patent specification for the proposition that MAC coordinator logic 606 is "subsumed within the corresponding structure of the signal transmission/reception coordination logic 404."

151. Plaintiff's proposed structure also includes the discussion of Figure 9 (14:28-15:22), portions of the discussion of Figure 10 (15:23-65), portions of the discussion of Figure 11 (16:53-67) and the discussion of Figure 13 (18:12-55). I discuss Figure 10 in paragraphs 137 to 139 above, and discuss Figures 9, 11, and 13 below.

152. Figure 9 (below) merely describes "a flow diagram 900 that illustrates another exemplary method for using MAC coordinator logic with multiple MACs and associated BB units." 14:28-30.

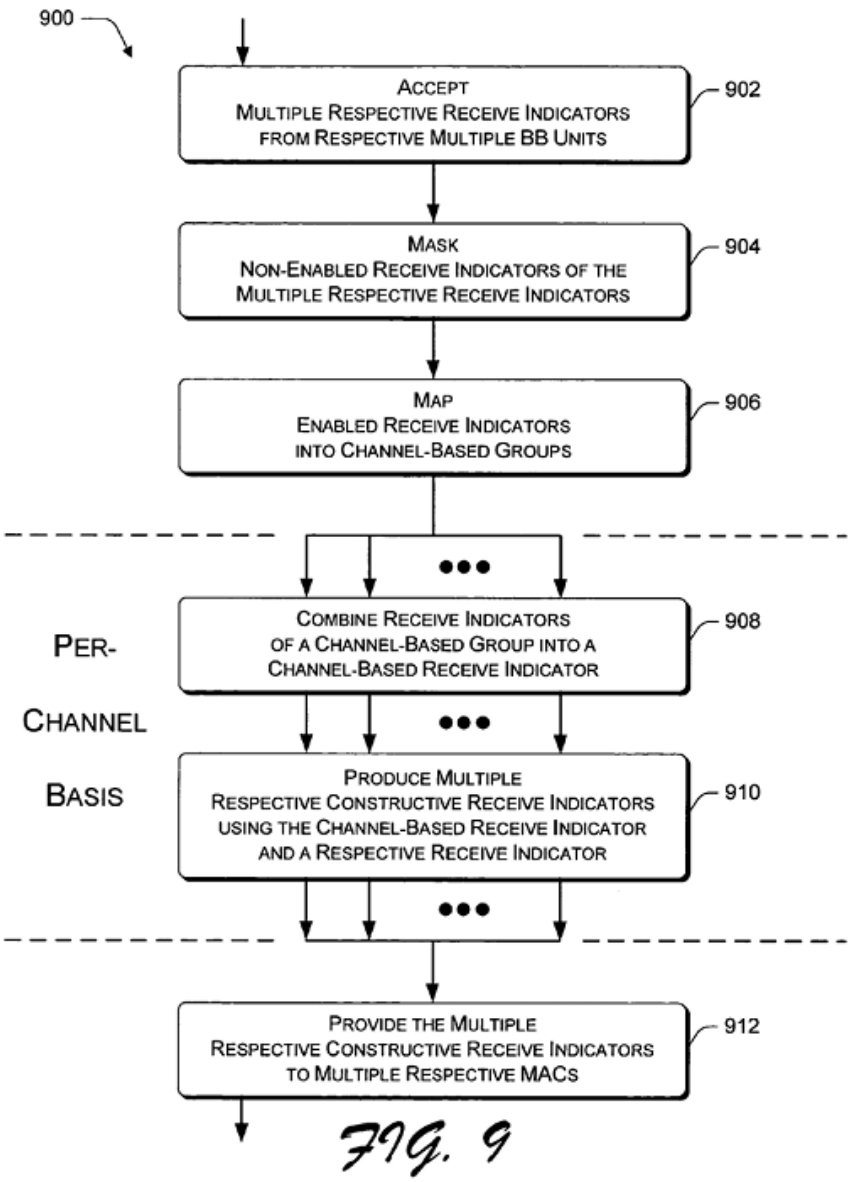

FIG. 9

153. However, the flowchart in Figure 9 merely states functions performed without any explanation as to what structure performs these functions. Also, this functional disclosure does not disclose any of the restrain on a different channel functions that I discuss above in paragraphs 131 and 132.

154. The disclosure in Figures 11 and 13 relate to a "multiple access station environment." 16:39-40, 18:12-13. However, while the disclosure of these embodiments mentions "signal transmission/reception coordination logic 404" and "MAC coordinator logic 606," they do

not impart any structure to either and describe both in functional terms. Further the descriptions accompanying these figures does not suggest that "signal transmission/reception coordination logic 404" and "MAC coordinator logic 606" perform functions that are different from those disclosed in Figures 4, 6, 8, and 10. As I explain above, "signal transmission/reception coordination logic 404" and "MAC coordinator logic 606" in Figures 4, 6, 8, and 10 do not perform the functions recited in claims 15 and 30.

Executed this 11th day of June, 2024.

Respectfully Submitted,

James A. Proctor, Jr.

Exhibit 1

James A. Proctor Jr.
1680 North Riverside Drive, Indialantic, FL 32903 - (321) 271-8411 - jproctor@ieee.org

EDUCATION

Georgia Institute of Technology, Atlanta, Georgia — M.S. Electrical Engineering
Graduated: September 1992
Interests: Digital Signal Processing, Communications, Optics

The University of Florida, Gainesville, Florida — B.S. Electrical Engineering
Graduated: May 1991
Minor Studies: Business
Honors & Activities: PI ETA SIGMA Honor Society
ALPHA LAMBDA DELTA Freshman Honor Society
ETA KAPPA NU National Electrical Engineering Fraternity

Skills & Achievements

- Successfully led Qualcomm / WiDeFi integration efforts resulting in a new product effort within Qualcomm related to the 3G/4G Market
- Co-founded WiDeFi and successfully raised >$14M of venture funding
- Generated intellectual property and product strategy leading to the acquisition of two companies (WiDeFi, and Tantivy Communications), contributing to > $100M of revenue
- Performed extensive customer and industry business development to provide support for innovative product definition, requirement definition, and customer support for business plan and forecasts (Qualcomm, WiDeFi, and Tantivy Communications)
- Led and coached many R&D teams to refine and de-risk innovative wireless concepts
- Led cross functional product teams to deliver high volume ready prototypes
- Ability to balance market, programmatic, and technical concerns and refine clear strategy and actionable plans
- Generated >320 issued US Patents Currently and >700 international patent publications
- Have spoken at numerous public events: industry, venture, and technical
- Strong communication and technical skills

Work Experience

Proctor Consulting, LLC — **December 2008 - Present**

- Early stage market and technology strategy
  - Interim CTO/Team Member, business development/validation
  - Roadmap / IP development
  - Advisory Board Member
- Technical / Market Consultant
  - Fastback Networks, Audigence, Peregrine Semiconductor
- Intellectual property portfolio analysis within the communications market space
  - Market / Product Applicability, Claims Chart Development and Analysis, Valuation
  - Expert Witness Consulting in Wireless Communications (WiFi, 2G-GSM, 3G-C2K/WCDMA, 4G/LTE and associated networks)

Proxicom Wireless. Co-Founder, Managing Director — **November 2011 – Present**

- Proximity based mobile technology utilizing a centralized trusted third party
- Development of foundational Intellectual Property (12+ US Patents)
- Enabling technology applicable to a variety of proximity based applications including highly secure: Mobile Payments, Electronic Coupons and Loyalty, Rating and Reviews, Social Commerce

Qualcomm Inc., Principal Engineer (Consulting) **October 2007 - October 2009**

- Technical and Business development leadership of a consumer level 3G wireless repeater product concept based upon WiDeFi's technology during the integration
- Provided technical leadership in architecture development
  - Defined initial architecture approach for the wireless repeater concept based upon WiDeFi's technology
  - Worked with technical team to refine approach and achieve "key proof points"
- Performed Business Development with International Wireless Operators
  - Worked closely with business development from ESG and QCT divisions
  - Developed bottoms up forecast with the top international wireless operators for consumer repeater products.
  - Refined product features to meet carrier's requirements
- Market Analysis to estimate Market Size and Competitive Landscape
- Named inventor on 44+ Issued or pending patents for Qualcomm on wireless repeater concepts

WiDeFi, Inc., EVP/CTO, and Co-Founder, Director **August 2005 - October 2007**

- Focused on aligning WiDeFi's technology and product roadmaps to customer and market drivers
  - Strategic and Technical Marketing, Product Definition
  - Market Analysis to estimate Market Size and Competitive Landscape
  - Collaborated with customers and internal team to define and pursue product/customer opportunities (Retail Wi-Fi, Mesh Repeater, VoiP over Wi-Fi Repeater, Cellular Repeaters, Wi-Max Repeaters, In-Building Distribution Systems)
  - Customer Development from initial contact, joint testing, first purchase order, to new product introduction
  - Contributed to and managed WiDeFi's IP portfolio
  - Pursued fund raising from corporate and venture capital communities

WiDeFi, Inc., President, CEO, and Co-Founder, Director **July 2002 - August 2005**

- Led WiDeFi from inception to the recruitment of an expansion-stage CEO.
- Principal duties:
  - Direct Fundraising of initial seed and Series A Venture Capital
  - General Management (Finance, Business Administration, Legal/Contracts and Organizational Development/Recruiting)
  - Coordination of Board of Directors and Investors
  - Sales (WiDeFi was Cash Flow positive prior to venture investment)

Tantivy Communications **April 1998 - June 2002**
Director of Strategic and Technical Marketing

- Business Development/Technical Due Diligence
- Represented Tantivy in a wide range of Wireless Broad Band Industry Conferences
- Intellectual Property Management and Strategy
  - Represented Tantivy's Patents and their value to External Companies
  - Performed Validity, Infringement, and Value Analysis of Tantivy Patents for non-Tantivy products
- Industry Standards Representation for 3G Technologies
  - TIA/3GPP2, Over 15 Technical Contributions/Papers
  - T1P1 (3GPP Member)
- Project Management of an International Technology Transfer Team (S Korea)
- Performed System Architecture and Analysis

Spectrian, **Advanced Development and Technical Marketing** **1995 - April 1998**

- Interfaced with NORTEL/Qualcomm's Product Management
- Performed Advanced Technology Development/Systems Analysis

Harris Corp. GCSD, **September 1992 - 1995**
Senior Engineer Signal Processing Section, Modems Group

Georgia Tech Research Institute, CSITL **June 1991 - August 1992**

Harris Corp.. ISD, Electro-optics, Co-op **May 1990 - August 1990**
- Acousto-optic signal processing

Standards Development

- Participated in architecting "Internet CDMA" (I-CDMA)
- Jointly led establishment of the Committee T1, working group T1P1.4 "WWINA" standardization effort, which stands for "Wireless Wideband Internet Access"
  - T1 Approved this system as the T1.723-2002 standard
- ATIS approved as **ATIS0700723-2002 I-CDMA Spread Spectrum Systems Air Interface Standard**
- Participated in 3GPP2 Standards Developments (including 15+ technical contributions)

Intellectual Property

- More than 320 Issued U.S. Patents
- More than 700 Issued or Pending International Patent Applications (WIPO)
- Patents Cited at the USPTO more than 6000 times
- 55+ Patents Assigned to Intel
- 45+ Patents Assigned to Qualcomm
- 16+ Patents designated as "Standards Essential" for UMTS (WCDMA)
- 6+ Patents designated as "Standards Essential" for LTE

Testifying Expert Experience

SPH Am., LLC v. Acer, Inc., 09CV02535-CAB MDD, 2012 WL 1344515 (S.D. Cal. Apr. 18, 2012).
Testifying Expert offering opinions on validity for the defense. The technology related to WCDMA modulation techniques. Resulted in settlement prior to trial.

WI-LAN USA, INC. and WI-LAN INC. v. ELEFONAKTIEBOLAGET LM ERICSSON and ERICSSON INC., Case No. l:12-23569-Civ (S.D. FL)
Testifying expert offering opinions on infringement for the defense. The technology involved LTE "contention free" handover (CFRA), and Media Access Control (MAC) layer messaging for Quality of Service (QOS). Resulted in a summary judgement finding of non-infringement for the defense, and settlement after appeal.

U.S. ETHERNET INNOVATIONS, LLC. V. STMICROELECTRONICS, INC.,
Civil Action No. 6:12-cv-4181-MHS-JDL
Testifying expert offering opinions on both validity and infringement for the defense. The technology related to Ethernet devices. Resulted in settlement prior to trial.

UNWIRED PLANET. V. SQUARE, INC.,
Case No. 3:13-CV-00579-RCJ-WGC, DISTRICT OF NEVADA,
Case CBM2014-00156, Case IPR2014-01164, Case IPR2014-01165, UNITED STATES PATENT TRIAL AND APPEAL BOARD,

Provided testimony related to claim construction, and validity for the defense. The technology was related to location based services (LBS). The case resulted in a finding by the Patent Trial and Appeal Board of unpatentability of all asserted claims.

PRISM TECHNOLOGIES LLC. V. T-MOBILE USA, INC., Case No. 12-CV-124

Testifying expert at trial, and deposition offering opinions on both validity and infringement for the defense. The technology was related to SIM/USIM/ISIM based authentication in UMTS, LTE, and IMS networks. The case resulted in a jury verdict of non-infringement.

FASTVDO LLC. V. AT&T Mobility LLC, AT&T Services, Inc., and Apple Inc.,
Case No. 3:16-cv-00385-H-WVG

Engaged by Apple as the testifying expert offering opinions on infringement for the defense. The technology was related to Forward Error Correction (FEC) and voice codecs in GSM and WCDMA standards, including detailed FEC performance simulations. The case was concluded based upon an IPR outcome finding unpatentable subject matter by the PTAB.

BLACKBERRY LIMITED V. BLU PRODUCTS, INC.,
Case No.: 16-23535-CIV-MORENO

Engaged by Blackberry as the testifying expert offering opinions on infringement for the plaintiff. The technology involved WCDMA and battery saving techniques in Radio Resource Control (RRC) states. The case was settled between the parties prior to trial.

CELLULAR COMMUNICATIONS EQUIPMENT LLC V. AT&T Inc., and Apple Inc.
Case No.: 2:15-cv-00576-RWS-RSP

Engaged engaged by Apple as the testifying expert offering opinions on validity and benefits of the alleged inventions for the defense. The technology involved Media Access Control (MAC) messaging for LTE (Power Headroom Reporting) and LTE Advanced (CSI reporting for Carrier Aggregation). The case resulted in summary judgement for the defense.

GENERAL ACCESS SOLUTIONS, LTD. v. Sprint Corporation et al.
Civil Action No. 2:16-cv- 00465 (E.D. Tex.) and PTAB Proceedings (IPR2017-01885 (Patent 7,173,916 B2) IPR2017-01887 (Patent 6,891,810 B2) IPR2017-01889 (Patent 7,230,931 B2),

Engaged by Sprint to provide expert testimony relating to claim construction, and validity for the defense before the Patent Trial and Appeal Board (PTAB) relating to an Inter Partes Review petition, providing multiple expert declarations, and deposition testimony. The technology related to Adaptive Modulation and Coding (AMC) in a wireless system; Adaptive Beamforming, Sectorization, and Multi-Input Multi-Output (MIMO). All trials were instituted by the PTAB Board, with a finding of all petitioned claims unpatentable for two of the three patents.

TC TECHNOLOGY LLC. V., Sprint Corporation and Sprint Spectrum, L.P
Case 1:16-cv-00153-RGA

Engaged by Sprint to provide expert testimony relating to validity and infringement by the defense, in the district of Delaware. The technology related to OFDMA and SC-FDMA use in the LTE uplink, for multiplexing transmissions from different UEs utilizing mutually exclusive OFDM subcarriers. The matter was resolved.

Mobility Workx, LLC v T-Mobile US, Inc.
Civil Action No. 4:17-cv-00567-ALM
Retained by the defendant, and provided declarations and deposition for claim construction, engaged for both invalidity and non-infringement analysis and testimony. This matter relates to LTE handover, and Mobile IP. The case was settled between the parties prior to trial.

Mobility Workx, LLC v Cellco Partnership d/b/a Verizon Wireless
Case No. 4:17-cv-872-ALM
Retained by the defendant, engaged for both invalidity and non-infringement analysis and testimony. This matter relates to LTE handover, and Mobile IP. The case further related to 3GPP compliance testing techniques. This matter was resolved during trial preparation.

Uniloc USA, Inc., et al. v. Apple Inc.
No. 18-cv-158 and 18-cv-161, engaged by Apple as a technical and testifying expert. This matter relates to Quality of Service aspect of 3G UMTS (WCDMA), and the request and allocation of uplink resources in LTE. The matter was stayed, pending result of PTAB IPR Trial.

Wi-LAN v. LG,
Case No. Case No.: 3:18-cv-01577-H-BGS
Engaged by LG as a technical and testifying expert. The technology involved LTE "contention free" handover (CFRA), Media Access Control (MAC) layer messaging for bandwidth management and Quality of Service (QOS). This matter was resolved.

Fractus, S.A. v. Sprint Communications Company, L.P. et al.,
Civil Action No. 2:18-cv-00135 (E.D. Tex.), Engaged by Sprint and Verizon Wireless as a technical and testifying expert for invalidity. The technology involved design aspects of antenna element placement in multiband antenna arrays for use at cellular base stations. This matter was resolved.

Wilson Electronics, LLC v.Cellphone-Mate,Inc. dba SureCall,
Case No. 2:17-cv- 00305-DB (District of Utah)
Retained by the Wilson Electronics, and engaged for both invalidity and non-infringement analysis and testimony in both district court and in ITU proceedings. This matter relates to cellular multi-band wireless signal boosters / repeaters. This matter was resolved.

Sol IP, LLC v Joint Defense Group (AT&T, Ericsson, Nokia, Sprint, Verizon)
Civil Action No. 2:18-cv-00526 (E.D. Tex.)
Retained by each of the defendants, and engaged to provide testimony relating to infringement of the asserted claims for 8 of the asserted patents. The subject matter related to random access, paging, resource allocation, and carrier aggregation in LTE. The matter was resolved.

Polaris PowerLED Technologies, LLC v. TCL Corporation, et al., C.D. California Civil Action No.: 8:20-cv-00127-JVS-DFMBGL Ref. No.: 16725-7 and 16725-8
Engaged by TCL and Hisense to provide expert testimony in district court and to provide a declaration as an expert in an Inter Party Review (IPR) proceeding before the U.S Patent Trial and Appeals Board. The subject matter related to power supply circuitry for use in backlight displays and U.S. Pat. No 11,011,752. The IPR was instituted, and the proceedings were terminated following settlement.

SmartSky Networks v. Wireless Systems Solutions, LLC; DAG Wireless Solutions, et al., M.D. North Carolina (Case No. 1:20-cv-00834-NCT-LPA), and related arbitration proceedings
Engaged by SmartSky to provide expert testimony related to a trade secret dispute in district court, and an arbitration proceeding. The technology related to air to ground internet service for aircraft using a proprietary LTE derived system including airborne radios and ground stations allowing for increased range and velocity beyond that which can be provided by standards based LTE systems. The system includes advanced UE and eNodeB architectures, and modified LTE protocols. I provided expert reports and declarations in both district court and arbitration. I further provided live testimony before an arbitration panel. The arbitration panel found in favor of SmartSky, achieving a successful injunction against WSS/DAG.

Dali Wireless v. JMA Wireless, Civil Action 1:99-mc-09999
Engaged by JMA Wireless to provide several declarations as an expert in an Inter Party Review (IPR) proceeding before the U.S Patent Trial and Appeals Board, and further testimony relating to the district course cases. The subject matter related to in-building wireless signal distribution systems utilizing digital network (CPRI / IP packetized) interfaces and as well as LTE eNodeB architectures. This matter was resolved pending expert discovery.

Dali Wireless v. Corning Optical Communications LLC, No. 3:20-cv-06469 (N.D. Cal.) and Dali Wireless, Inc. v. Corning Incorporated et al., No. 6:20-cv-00827 (W.D. Tex.)
Engaged by Corning to provide several declarations as an expert in an Inter Party Review (IPR) proceeding before the U.S Patent Trial and Appeals Board and further testimony relating to the district course cases. The subject matter related to distributed antenna systems for in-building wireless signal distribution as well as intercell frequency reuse and interference management techniques. This matter was resolved pending expert discovery.

Flexiworld Technologies, Inc. v. Amazon.com, Inc., et al., Case No. 6:20-cv-00553-ADA (W.D. Texas), and Case No. 2:21-cv-01055-DGE (W.D. Washington, Tacoma)
Engaged by Amazon to provide testimony for district court matter in the Western District of Texas. The matter related to approaches for mobile devices to utilize Bluetooth to interface with smart speakers and servers, allowing for the request of content to be played by an output device (speaker) based upon specific requests, including in some cases voice requests. This matter was transferred to Western District of Washington, Tacoma Division and remains pending.

WSOU Investments, LLC d/b/a Brazos Licensing and Development v. Huawei Technologies Co., Ltd. et al., 6:20-cv-00544 (W.D. Tex.)
Engaged by Huawei to provide expert testimony in district court. The matter related to LTE protocols and signaling, Hybrid ARQ, and scheduling of retransmissions relative to new transmissions from a UE to an eNodeB. I provided a claim construction declaration, prior to the matter being resolved.

Ericsson, Inc. IPR petition of 7,532,865, (TOT Power Control, S.L, Patent Owner)
Engaged by Ericsson, Inc. to provide a declaration as an expert in an Inter Party Review (IPR) proceeding before the U.S Patent Trial and Appeals Board, relating to US. Pat. No. 7,532,865. The matter involved “outer loop” power control techniques in WCDMA systems or other mobile devices.

Sierra Wireless et al, IPR petition of 7,215,653 (Sisvel, Patent Owner).
Engaged by Sierra Wireless to provide a declaration as an expert in an Inter Party Review (IPR) proceeding before the U.S. Patent Trial and Appeals Board, relating to US. Pat. No. 7,215,653. This matter involved the control of uplink data rates and power control in a CDMA system called 1xEV-DO developed within the 3GPP2 standards, in which I personally participated. The IPR was instituted by the PTAB, and all claims were found unpatentable.

KAIFI LLC v. T-Mobile US, Inc. et al., Case No. 2:20-cv-281-JRG (E.D. Tex.)
Engaged by T-Mobile to provide expert testimony for both (in)validity and (non)infringement for a district court matter in the Eastern District of Texas. The matter involved a mobile device’s roaming between an outdoor cellular / LTE networks and an indoor Wi-Fi network. It further included approaches for the LTE core network to perform the selection of transmission paths of VoLTE and VoWiFi signals involving the LTE core (EPC), including the ePDG, and IMS networks. This matter settled.

KAIFI LLC v. Verizon Wireless. et al., Civil Action No. 2:20-cv-00280-JRG (E.D. Tex.)
Engaged by Verizon to provide expert testimony relating to (in)validity for a district court matter in the Eastern District of Texas. The matter involved a mobile device's roaming between an outdoor cellular / LTE networks and an indoor Wi-Fi network. It further included approaches for the LTE core network to perform the selection of transmission paths of VoLTE and VoWiFi signals involving the LTE core (EPC), including the ePDG, and IMS networks. This matter settled.

NEO Wireless, LLC v. DELL Technologies Inc. and DELL Inc., Case No. 6:21-cv-024-ADA (W.D. Tex.)
Engaged by Dell to provide expert testimony relating to claim construction, (in)validity and (non)infringement in the Western District of Texas, Waco Division. The matter involved LTE and 5G devices and standards aspects including signaling aspect associated with: OFDM/OFDMA, resource scheduling and frame structures, random access and ranging, transmit diversity and beamforming signaling. This matter was settled by the parties.

American Patents v. Xerox., Case No. 6:21- cv-636-ADA, (W.D. Tex.)
Engaged by Xerox to provide expert testimony relating to claim construction, (in)validity and (non)infringement in the Western District of Texas, Waco Division. The matter involved IEEE802.11 (WiFi) based systems relating to a number of patents, including Time and frequency synchronization in multi-input, multi-output (MIMO) systems, the assessment and management of interference in 802.11 systems. This matter was resolved.

TurboCode, v. Dell Technologies Inc. and Dell Inc., Case No. Civil Action No. 6:21-cv-359 (W.D. of Tex.)
Engaged by Dell to provide expert testimony relating to claim construction, (in)validity and (non)infringement in the Western District of Texas, Waco Division. The matter involved 3G / WCDMA use and implementations of Turbo Coding in wireless transmission and reception. This matter was settled by the parties.

XR Communications d/b/a Vivato Technologies v. Microsoft Corporation, Case No: 6:21-cv-695 (WDTX)
Engaged by Microsoft to provide expert testimony relating to claim construction, (in)validity and (non)infringement in the Western District of Texas. The matter involved the use of transmit beamforming, channel estimation and diversity techniques in IEEE802.11n, 802.11AC, and 802.11AX systems (WiFi). This matter was settled by the parties.

Finesse Wireless, LLC v. AT&T Mobility LLC; Cellco Partnership d/b/a Verizon Wireless; Nokia of America Corporation; Ericsson Inc., Case No. 2:21-CV-00063-JRG (E.D. TX).
Engaged by Nokia to provide expert testimony relating to claim construction, (in)validity and (non)infringement in the Eastern District of Texas. The matter involved aspects of LTE and 5G infrastructure relating to the cancelation of radio frequency intermodulation distortion produced in a transmitter from the receiver of the same base station, and involving both passive intermodulation (PIM) and active intermodulation from Power amplifiers (PA). This matter remains pending.

GODO KAISHA IP BRIDGE v Ericsson and Nokia Case No. 2:21-CV-213-JRG, Case No. 2:21-CV-215-JRG (E.D. TX).
Engaged by Nokia and Ericsson to provide expert testimony relating to claim construction, (in)validity and (non)infringement in the Eastern District of Texas. The matter involved aspects of LTE and 5G infrastructure relating to the channel state information (CSI/CQI) configuration and triggering for periodic and aperiodic, wideband and sub-band reports from LTE/NR UEs. This matter was settled prior to trail.

Microsoft Corporation, IPR petition of '414, '763, '988, '890 (Lemco Corporation, Patent Owner).
Engaged by Microsoft Corporation to provide several declarations as an expert in Inter Party Review (IPR) proceedings before the U.S. Patent Trial and Appeals Board, relating to US. Pat. Nos. 7,653,414, 7,548,763, 7,855,988, and 9,191,980. These matters involved distributed cellular network infrastructure architectures. The patents relate to software implementations of cellular network infrastructure, including a distributed mobile architecture server and a distributed mobile architecture gateway. This matter remains pending.

Ozmo v. Dell, Case No: 6:22-cv-00642-ADA (WDTX)
Engaged by Dell to testimony related to claim construction, (in)validity and (non)infringement relating to U.S Pat. Nos. 8,599,814; 9,264,991; 10,873,906; 11,012,934; 11,122,504; and 11,252,659 and share common provisional applications. The subject matter of the patents relate to seamlessly integrating short-range wireless personal area networks ("WPANs") into longer-range wireless local area networks. ("WLANs").

XR Communications d/b/a Vivato Technologies v. ASUSTek Computer Inc., Computer Inc.
Case No: 6:21-cv-00622-ADA (WDTX)
Engaged by ASUSTek to provide expert testimony relating to claim construction, (in)validity and (non)infringement in the Western District of Texas. The matter involved the use of transmit beamforming, channel estimation and diversity techniques in IEEE802.11n, 802.11ac, and 802.11ax systems (WiFi). This matter was settled.

Cobblestone Wireless, LLC v AT&T, T-Mobile, and Verizon.
Case No: 2:2-cv-00474, 2:23-cv-00477, 2:23-cv-00478 (E.D. Tex.)
Engaged by Joint Defense Group (including Nokia and Ericsson) to provide several declarations as an expert in Inter Party Review (IPR) proceedings before the U.S. Patent Trial and Appeals Board. Provided declarations for US Pat. Nos. 10,368,361, 9,094,888, 8,554,196, 10,368,361, 8,891,347. I was further engaged to provide expert testimony relating to Interparty claim construction, (in)validity and (non)infringement in the Eastern District of Texas. The matter involved various aspects of 3GPP LTE and 5G transmit beamforming, including: handoff, beam and frequency resource management, beam management and selection, adaptation based upon Channel State information (CSI), This matter remains pending.

Samsung v. Cobblestone Wireless, LLC.
Engaged by Samsung to provide several declarations as an expert in Inter Party Review (IPR) proceedings before the U.S. Patent Trial and Appeals Board. Provided declarations for US Pat. Nos. 10,368,361, 9,094,888, 8,554,196, 10,368,361, 8,891,347. The matter involved various aspects of 3GPP LTE and 5G transmit beamforming, including: handoff, beam and frequency resource management, beam management and selection, adaptation based upon Channel State information (CSI), This matter remains pending.

Lenovo (United States) Inc. v. ASUSTeK Computer Inc.; ASUS Computer International.
Case No.: 23-CV- 5892 (N.D. Cal.), ITC matter Inv. No. 337-TA-1382
Engaged by AsusTek to provide opinions regarding claim construction, validity and infringement of US. Pat. Nos. 7,792,066 and 10,952,203. The technology included Wake on Wireless Lan utilizing magic packets and the PS mode of 802.11 devices, and personal computer architecture and power states (APM,ACPI). The technology further included the use of triggered based uplink OFDMA resource allocation in WiFi 6 (802.11AX). This matter remains pending.

List of Issued U.S. Patents

United States Pat. No.	Title
5,550,549	Transponder system and method
5,687,196	Range and bearing tracking system with multipath rejection
5,898,338	Adaptive digital predistortion linearization and feed-forward correction of RF power amplifier
5,929,704	Control of RF error extraction using auto-calibrating RF correlator
5,949,283	Adaptive digital predistortion linearization and feed-forward correction of RF power amplifier
5,960,047	System and method for transmitting information signals
6,078,216	Aliased wide band performance monitor for adjusting predistortion and vector modulator control parameters of RF amplifier
6,100,843	Adaptive antenna for use in same frequency networks
6,212,220	Method and apparatus for creating non-interfering signals using non-orthogonal techniques
6,222,832	Fast Acquisition of traffic channels for a highly variable data rate reverse link of a CDMA wireless communication system
6,239,756	Antenna array with housing
6,301,291	Pilot symbol assisted modulation and demodulation in wireless communication systems
6,304,215	Method of use for an adaptive antenna in same frequency networks
6,362,790	Antenna array structure stacked over printed wiring board with beamforming components
6,388,999	Dynamic bandwidth allocation for multiple access communications using buffer urgency factor
6,396,456	Stacked dipole antenna for use in wireless communications systems
6,400,317	Method and apparatus for antenna control in a communications network
6,404,386	Adaptive antenna for use in same frequency networks
6,421,336	Variable rate orthogonally coded reverse link structure
6,448,938	Method and apparatus for frequency selective beam forming
6,452,913	Fast acquisition of traffic channels for a highly variable data rate reverse link of a CDMA wireless communication system
6,456,835	Arbitration method for high power transmissions in a code division multiple access system
6,473,036	Method and apparatus for adapting antenna array to reduce adaptation time while increasing array performance
6,515,635	Adaptive antenna for use in wireless communication systems
6,518,920	Adaptive antenna for use in same frequency networks
6,542,481	Dynamic bandwidth allocation for multiple access communication using session queues
6,545,990	Method and apparatus for a spectrally compliant cellular communication system
6,545,994	Access probe acknowledgment including collision detection to avoid oversetting initial power level
6,563,809	Subscriber-controlled registration technique in a CDMA system
6,600,456	Adaptive antenna for use in wireless communication systems
6,614,776	Forward error correction scheme for high rate data exchange in a wireless system
6,678,260	System and method for maintaining wireless channels over a reverse link of a CDMA wireless communication system
6,707,804	Fast acquisition of traffic channels for a highly variable data rate reverse link of a CDMA wireless communication system
6,785,323	Variable rate coding for forward link
6,788,268	Method and apparatus for frequency selective beam forming
6,792,290	Method and apparatus for performing directional re-scan of an adaptive antenna
6,801,564	Reverse link correlation filter in wireless communication systems
6,804,223	Reverse link pilot integrated with block codes
6,873,293	Adaptive receive and omnidirectional transmit antenna array
6,888,504	Aperiodic array antenna
6,888,807	Applying session services based on packet flows

6,894,653	Low cost multiple pattern antenna for use with multiple receiver systems
6,904,079	Access channel structure for wireless communication system
6,911,879	Electronic phase shifter with enhanced phase shift performance
6,917,581	Use of orthogonal or near orthogonal codes in reverse link
6,917,642	Method for using a non-orthogonal pilot signal with data channel interference cancellation
6,925,070	Time-slotted data packets with a preamble
6,928,064	Fast acquisition of traffic channels for a highly variable data rate reverse link of a CDMA wireless communication system
6,933,887	Method and apparatus for adapting antenna array using received predetermined signal
6,937,562	Application specific traffic optimization in a wireless link
6,940,842	System and method for maintaining wireless channels over a reverse link of a CDMA wireless communication system
6,941,152	Wireless subscriber network registration system for configurable services
6,954,448	Alternate channel for carrying selected message types
6,956,840	Power control protocol for highly variable data rate reverse link of a wireless communication system
6,973,140	Maximizing data rate by adjusting codes and code rates in CDMA system
6,989,797	Adaptive antenna for use in wireless communication systems
6,992,546	Electronic phase shifter with enhanced phase shift performance
7,002,902	Method and system for economical beam forming in a radio communication system
7,006,428	Method for allowing multi-user orthogonal and non-orthogonal interoperability of code channels
7,006,483	Qualifying available reverse link coding rates from access channel power setting
7,009,559	Method and apparatus for adapting antenna array using received predetermined signal
7,015,773	Electronic phase shifter with enhanced phase shift performance
7,034,759	Adaptive receive and omnidirectional transmit antenna array
7,072,316	Subscriber-controlled registration technique in a CDMA system
7,079,523	Maintenance link using active/standby request channels
7,092,430	Method for using a non-orthogonal pilot signal with data channel interference cancellation
7,113,786	Antenna adaptation to manage the active set to manipulate soft hand-off regions
7,145,964	Maximizing data rate by adjusting codes and code rates in CDMA system
7,176,844	Aperiodic array antenna
7,184,417	Power control protocol for highly variable data rate reverse link of a wireless communication system
7,187,904	Frequency translating repeater with low cost high performance local oscillator architecture
7,200,134	Wireless area network using frequency translation and retransmission based on modified protocol messages for enhancing network coverage
7,215,297	Adaptive antenna for use in wireless communication systems
7,218,623	Coded reverse link messages for closed-loop power control of forward link control messages
7,221,664	Transmittal of heartbeat signal at a lower level than heartbeat request
7,224,685	Method of detection of signals using an adaptive antenna in a peer-to-peer network
7,227,907	Antenna adaptation comparison method for high mobility
7,230,935	Physical layer repeater with selective use of higher layer functions based on network operating conditions
7,233,627	Method for searching pilot signals to synchronize a CDMA receiver with an associated transmitter
7,233,771	Non-frequency translating repeater with downlink detection for uplink and downlink synchronization
7,253,783	Low cost multiple pattern antenna for use with multiple receiver systems
7,272,169	Reverse link correlation filter in wireless communication systems
7,289,827	Method and apparatus for performing directional re-scan of an adaptive antenna
7,308,285	Antenna adaptation in a time division duplexing system
7,366,154	Forward error correction scheme for high rate data exchange in a wireless system
7,394,791	Multi-detection of heartbeat to reduce error probability
7,425,928	Method and apparatus for frequency selective beam forming
7,426,241	Variable rate coding for forward link

7,428,263	Method for using a non-orthogonal pilot signal with data channel interference cancellation
7,433,340	Staggering forward and reverse wireless channel allocation timing
7,447,187	Reverse link pilot integrated with block codes
7,463,200	Directional antenna configuration for TDD repeater
7,463,201	Aperiodic array antenna
7,480,280	Fast acquisition of traffic channels for a highly variable data rate reverse link of a CDMA wireless communication system
7,483,473	Access channel structure for wireless communication system
7,496,072	System and method for controlling signal strength over a reverse link of a CDMA wireless communication system
7,502,351	Alternate channel for carrying selected message types
7,502,424	Maximizing data rate by adjusting codes and code rates
7,528,789	Adaptive antenna for use in wireless communication systems
7,529,264	Use of orthogonal or near orthogonal codes in reverse link
7,551,663	Use of correlation combination to achieve channel detection
7,580,674	Intelligent interface for controlling an adaptive antenna array
7,586,880	Method of detection of signals using an adaptive antenna in a peer-to-peer network
7,592,969	Multiple-antenna device having an isolation element
7,593,380	Variable rate forward error correction for enabling high performance communication
7,602,749	Fast acquisition of traffic channels for a highly variable data rate reverse link of a CDMA wireless communication system
7,613,227	Reverse link correlation filter in wireless communication systems
7,701,903	Power control protocol for highly variable data rate reverse link of a wireless communication system
7,733,285	Integrated, closely spaced, high isolation, printed dipoles
7,746,830	System and method for maintaining wireless channels over a reverse link of a CDMA wireless communication system
7,773,566	System and method for maintaining timing of synchronization messages over a reverse link of a CDMA wireless communication system
7,787,408	Wireless repeater with master/slave configuration
7,826,437	Variable rate coding for enabling high performance communication
7,889,702	Time-slotted data packets with a preamble
7,893,889	Multiple-antenna device having an isolation element
7,907,513	Superimposed composite channel filter
7,907,891	Physical layer repeater utilizing real time measurement metrics and adaptive antenna array to promote signal integrity and amplification
7,911,985	Automatic gain control and filtering techniques for use in on-channel repeater
7,911,993	Method and apparatus for allowing soft handoff of a CDMA reverse link utilizing an orthogonal channel structure
7,916,772	Method for searching pilot signals to synchronize a CDMA receiver with an associated transmitter
7,936,728	System and method for maintaining timing of synchronization messages over a reverse link of a CDMA wireless communication system
7,936,736	Enforcing policies in wireless communication using exchanged identities
7,944,845	Application specific traffic optimization in a wireless link
7,990,904	Wireless network repeater
8,023,885	Non-frequency translating repeater with downlink detection for uplink and downlink synchronization
8,027,642	Transmission canceller for wireless local area network
8,045,536	Forward error correction scheme for high rate data exchange in a wireless system
8,059,727	Physical layer repeater configuration for increasing MIMO performance
8,060,009	Wireless local area network repeater with automatic gain control for extending network coverage
8,068,474	Variable rate coding for enabling high performance communication
8,072,944	Staggering forward and reverse wireless channel allocation timing
8,072,958	Reverse link pilot integrated with block codes
8,078,100	Physical layer repeater with discrete time filter for all-digital detection and delay generation
8,089,913	Physical layer repeater with selective use of higher layer functions based on network operating conditions

8,090,359	Exchanging identifiers between wireless communication to determine further information to be exchanged or further services to be provided
8,090,616	Visual identification information used as confirmation in a wireless communication
8,095,067	Frequency translating repeater with low cost high performance local oscillator architecture
8,111,645	Wireless local area network repeater with detection
8,116,239	Use of a filterbank in an adaptive on-channel repeater utilizing adaptive antenna arrays
8,116,749	Protocol for anonymous wireless communication
8,121,535	Configuration of a repeater
8,122,134	Reducing loop effects in a wireless local area network repeater
8,134,980	Transmittal of heartbeat signal at a lower level than heartbeat request
8,139,546	System and method for maintaining wireless channels over a reverse link of a CDMA wireless communication system
8,155,096	Antenna control system and method
8,175,120	Minimal maintenance link to support synchronization
8,194,783	Variable rate coding for a forward and reverse link
8,204,140	Subscriber unit and method for variable forward error correction (FEC) decoding
8,238,912	Non-intrusive detection of enhanced capabilities at existing cellsites in a wireless data communication system
8,259,687	Dynamic bandwidth allocation for multiple access communications using buffer urgency factor
8,259,744	Use of orthogonal or near orthogonal codes in reverse link
8,265,630	Antenna adaptation to manage the active set to manipulate soft hand-off regions
8,274,954	Alternate channel for carrying selected message types
8,285,201	Wideband echo cancellation in a repeater
8,315,294	Method for searching pilot signals to synchronize a CDMA receiver with an associated transmitter
8,321,542	Wireless channel allocation in a base station processor
8,358,969	Feedback delay control in an echo cancellation repeater
8,363,590	Physical layer repeater with roaming support based on multiple identifiers
8,369,277	Signaling for wireless communications
8,369,842	Exchanging identifiers between wireless communication to determine further information to be exchanged or further services to be provided
8,370,955	Enforcing policies in wireless communication using exchanged identities
8,374,592	Exchanging identifiers between wireless communication to determine further information to be exchanged or further services to be provided
8,385,305	Hybrid band intelligent backhaul radio
8,385,818	Delay control to improve frequency domain channel estimation in an echo cancellation repeater
8,385,896	Exchanging identifiers between wireless communication to determine further information to be exchanged or further services to be provided
8,385,913	Using a first wireless link to exchange identification information used to communicate over a second wireless link
8,422,540	Intelligent backhaul radio with zero division duplexing
8,437,329	Variable rate coding for enabling high performance communication
8,437,330	Antenna control system and method
8,463,255	Method and apparatus for a spectrally compliant cellular communication system
8,467,353	Time-slotted data packets with a preamble
8,467,363	Intelligent backhaul radio and antenna system
8,477,665	Method in a wireless repeater employing an antenna array for interference reduction
8,498,234	Wireless local area network repeater
8,502,733	Transmit co-channel spectrum sharing
8,503,926	IQ imbalance compensation in interference cancellation repeater using a zero-IF radio architecture
8,509,268	Minimal maintenance link to support sychronization
8,509,835	Reverse link initial power setting using effective radiated power message to compute path loss
8,521,862	Wireless channel allocation in a base station processor
8,526,401	Power control protocol for highly variable data rate reverse link of wireless communication system

8,537,656	Method for compensating for multi-path of a CDMA reverse link utilizing an orthogonal channel structure
8,542,623	Use of RF reference in a digital baseband interference cancellation repeater
8,553,610	Interference cancellation repeater incorporating a non-linear element
8,559,379	Method and apparatus for mitigating oscillation between repeaters
8,576,805	Subscriber-controlled registration technique in a CDMA system
8,582,552	Maintaining a maintenance channel in a reverse link of a wireless communications system
8,599,906	Closed form calculation of temporal equalizer weights used in a repeater transmitter leakage cancellation system
8,605,702	Maintaining a maintenance channel in a reverse link of a wireless communications system
8,619,837	Use of adaptive antenna array in conjunction with an on-channel repeater to improve signal quality
8,630,211	Hybrid radio architecture for repeaters using RF cancellation reference
8,638,839	Intelligent backhaul radio with co-band zero division duplexing
8,638,877	Methods, apparatuses and systems for selective transmission of traffic data using orthogonal sequences
8,649,418	Enhancement of the channel propagation matrix order and rank for a wireless channel
8,676,131	Method and apparatus for allowing soft handoff of a CDMA reverse link utilizing an orthogonal channel structure
8,687,606	Alternate channel for carrying selected message types
8,709,092	Periprosthetic fracture management enhancements
8,737,343	Coded reverse link messages for closed-loop power control of forward link control messages
8,755,360	Method and apparatus for a spectrally compliant cellular communication system
8,755,473	Method and apparatus for detecting rapid changes in signaling path environment
8,774,079	Repeater techniques for multiple input multiple output utilizing beam formers
8,787,248	Method in a wireless repeater employing an antenna array including vertical and horizontal feeds for interference reduction
8,790,321	Apparatus, system, and method for harvesting improved bone graft material with reamer-irrigator-aspirator (RIA) device
8,792,458	System and method for maintaining wireless channels over a reverse link of a CDMA wireless communication system
8,811,367	Qualifying available reverse link coding rates from access channel power setting
8,824,442	Intelligent backhaul radio with adaptive channel bandwidth control
8,830,977	Reverse link pilot integrated with block codes
8,842,642	Transmitting acknowledgement messages using a staggered uplink time slot
8,849,186	Repeater communication using inserted low power sequences
8,849,698	Exchanging identifiers between wireless communication to determine further information to be exchanged or further services to be provided
8,861,429	Selective carrier amplification in a wireless repeater
8,885,688	Control message management in physical layer repeater
8,897,340	Enhancement of the channel propagation matrix order and rank for a wireless channel
8,908,654	Dynamic bandwidth allocation for multiple access communications using buffer urgency factor
8,937,874	Adjusting repeater gains based upon received downlink power level
8,942,216	Hybrid band intelligent backhaul radio
8,948,235	Intelligent backhaul radio with co-band zero division duplexing utilizing transmitter to receiver antenna isolation adaptation
8,958,457	Channel structure for a wireless communication system
8,964,909	Maximizing data rate by adjusting codes and code rates
8,989,762	Advanced backhaul services
9,014,118	Signaling for wireless communications
9,019,930	Coded reverse link messages for closed-loop power control of forward link control messages
9,020,009	Inserted pilot construction for an echo cancellation repeater
9,020,621	Network based media enhancement function based on an identifier
9,038,129	Enforcing policies in wireless communication using exchanged identities
9,042,400	Multi-detection of heartbeat to reduce error probability
9,135,612	Proximity detection, virtual detection, or location based triggering of the exchange of value and information
9,161,164	Exchanging identifiers between wireless communication to determine further information to be exchanged or further services to be provided

9,179,240	Transmit co-channel spectrum sharing
9,185,604	Qualifying available reverse link coding rates from access channel power setting
9,210,616	Application specific traffic optimization in a wireless link
9,225,395	Antenna control system and method
9,226,295	Hybrid band radio with data direction determined by a link performance metric
9,237,209	Time-slotted data packets with a preamble
9,247,510	Use of correlation combination to achieve channel detection
9,252,857	Embedded control signaling for wireless systems
9,294,222	Variable rate coding for forward and reverse link
9,301,274	Minimal maintenance link to support synchronization
9,306,658	Method and apparatus for a spectrally compliant cellular communication system
9,306,703	Variable rate coding for enabling high performance communication
9,307,532	Signaling for wireless communications
9,325,398	Method for installing a backhaul radio with an antenna array
9,325,477	Alternate channel for carrying selected message types
9,345,523	Periprosthetic fracture management enhancements
9,363,759	Power control protocol for highly variable data rate reverse link of a wireless communication system
9,369,235	Maximizing data rate by adjusting codes and code rates
9,374,822	Method for installing a hybrid band radio
9,397,808	Reverse link pilot integrated with block codes
9,398,120	Time-slotted data packets with a preamble
9,456,376	Subscriber-controlled registration technique in a CDMA system
9,456,428	Method and apparatus for allowing soft handoff of a CDMA reverse link utilizing an orthogonal channel structure
9,460,433	Proximity detection, virtual detection, or location based triggering of the exchange of value and information
9,490,918	Zero division duplexing MIMO backhaul radio with adaptable RF and/or baseband cancellation
9,496,915	Use of orthogonal or near orthogonal codes in reverse link
9,497,761	Qualifying available reverse link coding rates from access channel power setting
9,522,066	Periprosthetic fracture management enhancements
9,525,923	Multi-detection of heartbeat to reduce error probability
9,554,061	Smart hub
9,555,169	Apparatus for harvesting improved bone graft material utilizing an implantable biodegradable filter
9,572,163	Hybrid band radio with adaptive antenna arrays
9,577,733	Method for installing a backhaul link with multiple antenna patterns
9,655,062	System and method for coordination of wireless maintenance channel power control
9,661,583	Reverse link initial power setting using effective radiated power message to compute path loss
9,686,713	Application specific traffic optimization in a wireless link
9,686,790	Signaling for wireless communications
9,713,019	Self organizing backhaul radio
9,713,157	Method for installing a backhaul link with alignment signals
9,775,115	Antenna control system and method
9,780,930	Communicating reference and data information in a wireless network
9,781,626	Wireless channel allocation in a base station processor
9,807,714	Minimal maintenance link to support synchronization
9,832,664	Receiving and transmitting reverse link signals from subscriber units
9,867,101	Method and apparatus for allowing soft handoff of a CDMA reverse link utilizing an orthogonal channel structure
9,872,196	Subscriber-controlled registration technique in a CDMA system
9,876,530	Advanced backhaul services
9,913,271	Qualifying available reverse link coding rates from access channel power setting

9,913,722	Periprosthetic fracture management enhancements
9,924,468	Antenna control system and method
9,936,500	Transmitting acknowledgement messages using a staggered uplink time slot
9,954,635	Variable rate coding for enabling high performance communication
9,974,116	Handoff to base station having enhanced capabilities
10,057,700	Smart hub
10,063,363	Zero division duplexing MIMO radio with adaptable RF and/or baseband cancellation
10,064,144	Use of correlation combination to achieve channel detection
10,129,888	Method for installing a fixed wireless access link with alignment signals
10,153,885	Alternate channel for carrying selected message types
10,204,357	Proximity detection, virtual detection, or location based triggering of the exchange of value and information
10,211,940	Use of orthogonal or near orthogonal codes in reverse link
10,237,760	Self organizing backhaul radio
10,284,253	Advanced backhaul services
10,286,123	Removable biocompatible substrate filter for a reaming and collection device
10,299,218	System and method for coordination of wireless maintenance channel power control
10,306,635	Hybrid band radio with multiple antenna arrays
10,356,782	Embedded control signaling for self-organizing wireless backhaul radio and systems
10,357,370	Periprosthetic fracture management enhancements
10,390,311	Maintaining a maintenance channel in a reverse link of a wireless communications system
10,638,468	Qualifying available reverse link coding rates from access channel power setting
10,687,161	Smart hub
10,687,950	Periprosthetic shoulder fracture repair
10,700,733	Advanced backhaul services
10,708,918	Electronic alignment using signature emissions for backhaul radios
10,735,979	Self organizing backhaul radio
10,736,110	Method for installing a fixed wireless access link with alignment signals
10,762,532	Proximity detection, virtual detection, or location based triggering of the exchange of value and information
10,805,887	Maintaining a maintenance channel in a reverse link of a wireless communications system
10,821,030	Apparatus and method for a temperature released adhesive structure for use with bandages
10,874,520	Combination intra-medullary and extra-medullary fracture stabilization with aligning arm
10,932,267	Hybrid band radio with multiple antenna arrays
10,966,201	Embedded control signaling for self-organizing wireless backhaul radio and systems
11,000,380	Combination intra-medullary and extra medullary fracture stabilization with aligning arm
11,013,605	Combination intra-medullary and extra medullary fracture stabilization with aligning arm
11,074,615	Efficient and secure communication using wireless service identifiers
11,219,527	Combination intra-medullary and extra-medullary fracture stabilization with aligning arm
11,238,499	Proximity detection, virtual detection, or location based triggering of the exchange of value and information
11,260,164	Negative pressure wound therapy dressing and related apparatus
11,303,322	Advanced backhaul services
11,310,614	Smart Hub
11,334,918	Exchanging identifiers between wireless communication to determine further information to be exchanged or further services to be provided
11,343,060	Zero division duplexing MIMO radio with adaptable RF and/or baseband cancellation
11,343,684	Self organizing backhaul radio
11,437,740	Removable biocompatible substrate filter for a reaming and collection device
11,443,344	Efficient and secure communication using wireless service identifiers
11,6333,217	Reduction and fixation apparatus for calcaneal fracture

11,684,518	Apparatus and method for a temperature released adhesive structure for use with bandages
11,687,971	Efficient and secure communication using wireless service identifiers
11,723,776	Periprosthetic shoulder fracture repair
11,995,685	Efficient and secure communication using wireless service identifiers
D532780	Wireless repeater housing